



X 5

102

137

THE BULLETIN
OF THE
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE
RALEIGH

Vol. 37, No. 1

JANUARY, 1916

Whole No. 216

ANNUAL REPORT
OF
FARMERS' INSTITUTES

PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

**Entered at the Postoffice at Raleigh, N. C., as second class matter,
February 7, 1901, under Act of June 6, 1900.**

EDWARDS & BROUGHTON PRINTING CO.
STATE PRINTERS

STATE BOARD OF AGRICULTURE

W. A. GRAHAM, Commissioner, *ex officio* Chairman, Raleigh.

F. P. LATHAM.....	Belhaven.....	First District.
C. W. MITCHELL.....	Anander.....	Second District.
R. L. WOODARD.....	Pamlico.....	Third District.
CLARENCE POE.....	Raleigh.....	Fourth District.
R. W. SCOTT.....	Haw River.....	Fifth District.
A. T. McCALLUM.....	Red Springs.....	Sixth District.
C. C. WRIGHT.....	Hunting Creek.....	Seventh District.
WILLIAM BLEDSOE.....	Gale.....	Eighth District.
W. J. SHUFORD.....	Hickory.....	Ninth District.
A. CANNON.....	Horse Shoe.....	Tenth District.

OFFICERS AND STAFF

W. A. GRAHAM.....	Commissioner.
K. W. BARNES.....	Secretary and Purchasing Agent.
MISS SARAH D. JONES.....	Bookkeeper.
D. G. COSS.....	Bulletin Superintendent.
B. W. KILGORE.....	State Chemist, Director Test Farms.
J. M. PICKEL.....	Feed Chemist.
W. G. HAYWOOD.....	Fertilizer Chemist.
J. Q. JACKSON.....	Assistant Chemist.
E. S. DEWAR.....	Assistant Chemist.
E. B. HARR.....	Assistant Chemist.
D. M. McCARTY.....	Assistant Chemist.
F. C. WIGGINS.....	Assistant Chemist.
J. F. HAICH.....	Fertilizer Clerk.
R. W. COLLETT.....	Assistant Director Test Farms.
H. H. BRIMLEY.....	Curator of Museum.
T. W. ADICKS.....	Assistant Curator.
FRANKLIN SHERMAN, JR.....	Entomologist.
R. W. LEBRY.....	Assistant Entomologist.
S. C. CLAPP.....	Assistant Entomologist in Field Work.
B. B. FLOWE.....	Veterinarian.
H. P. FLOWE.....	Assistant Veterinarian.
E. G. HARGETT.....	Assistant Veterinarian.
W. N. HUTT.....	Horticulturist.
R. G. HILL.....	Assistant Horticulturist.
C. D. MATTHEWS.....	Assistant Horticulturist.
T. B. PARKER.....	Director of Farmers' Institutes.
W. M. ALLEN.....	Chemist and Chief, Division Food and Oil Inspection.
E. W. THOLINSON.....	Assistant Chemist, Division Food and Oil Inspection.
C. E. BILL.....	Assistant Chemist, Division Food and Oil Inspection.
LELAND B. RHODES.....	Assistant Chemist, Division Food and Oil Inspection.
C. B. WILLIAMS.....	Agronomist.
J. K. PLUMMER.....	Soil Chemist.
W. F. PATT.....	Agronomist in Soils.
R. Y. WINTERS.....	Plant Breeding.
*W. L. HEALIN.....	State Soil Agent, Soil Survey.
L. E. BRINKLEY.....	Soil Survey.
H. D. LAMBERT.....	Soil Survey.
J. L. BURGESS.....	Soil Survey.
C. H. WALDRON.....	Agronomist and Botanist.
MISS LOUISE A. RADENMACHER.....	Assistant to Botanist.
MISS ALMA E. STONE.....	Assistant to Botanist.
DAN T. GRAY.....	Chief in Animal Industry.
R. S. CURTIS.....	Associate in Animal Industry.
W. H. EATON.....	Dairy Experiment.
*ALVIN J. REED.....	Dairy Farming.
STANLEY COMBES.....	Assistant in Dairy Farming.
*J. A. ARDY.....	Assistant in Dairy Farming.
F. R. FARNHAM.....	Assistant in Dairy Farming.
I. T. PEDON.....	Beef Cattle.
*A. L. JORDAN.....	Beef Cattle.
*J. D. McVEAN.....	Pig Clubs.
*LAMB HOSTETTER.....	Assistant in Beef Cattle and Swine.
*A. G. OLIVER.....	Poultry Clubs.
*E. H. MATHEWSON.....	Tobacco Investigations.
*C. R. HEDGECOCK.....	Farm Demonstration Work.
*T. E. BROWN.....	Assistant in Charge of Boys' Clubs.
*A. K. ROHRERSON.....	Assistant in Boys' Clubs.
*MRS. JANE S. McKIMMON.....	Assistant in Charge Girls' Clubs.
MISS M. L. JAMISON.....	Assistant in Home Economics.

C. E. CLARK, Assistant Director Edgecombe Test Farm, Rocky Mount, N. C.

F. T. McVORAM, Assistant Director Fredell Test Farm, Statesville, N. C.

JOHN H. JEFFERSON, Assistant Director Pender Test Farm, Willard, N. C.

S. L. DAVENSON, Assistant Director Transylvania and Buncombe Test Farms, Swannanoa, N. C.

E. G. MOSS, Assistant Director Granville Test Farm, Oxford, N. C.

*Assigned by the Bureau of Soils, United States Department of Agriculture.

Assigned by the Bureau of Animal Husbandry, United States Department of Agriculture.

In cooperation with Bureau of Plant Industry, United States Department of Agriculture.

LETTER OF TRANSMITTAL

HON. W. A. GRAHAM,
Commissioner of Agriculture.

SIR:—Herewith you will find the statistical report of the Farmers' and Women's Institutes for the current year.

This partial report is in accordance with a resolution passed by the Board of Agriculture at its last meeting, ordering that the Farmers' Institute Bulletin shall be published in sections, and that a section shall not exceed sixteen pages in size. To comply with that resolution I have been forced to leave out much material that I otherwise would have included in this report.

Respectfully,

T. B. PARKER,
Director of Farmers' Institutes.

Approved for printing:
W. A. GRAHAM,
Commissioner.

REPORT OF FARMERS' AND WOMEN'S INSTITUTES, 1915

BY T. B. PARKER, DIRECTOR OF FARMERS' INSTITUTES.

The following number of Farmers' and Women's Institutes were held in the State under the auspices of the State Department of Agriculture from December 1, 1914, to December 1, 1915: Farmers' Institutes, regular, 198, attendance, 25,638; special institutes, 15, attendance, 580; institutes for negroes, 8, attendance, 720. Total attendance at Farmers' Institutes, 26,938. Women's Institutes, regular, 283, attendance, 23,091; special institutes, 15, attendance, 1,562; for negroes, 8, attendance, 1,121. Total attendance at Women's Institutes, 25,774. Total at Farmers' and Women's Institutes, 52,712.

The above report of attendance does not include Orchard Demonstration meetings, Dairy Schools, and other meetings, many of which have heretofore been counted in with attendance for Farmers' Institutes.

INSTITUTES, 1915.

County	Date	Place	Lecturers
Alamance	July 24	Elon College	French, Pate, Mrs. Hutt.
	July 27	Woodlawn School	Sherman, Ikeler, Parker, R. E., Mrs. Hollowell.
	July 28	Springs Graded School	Sherman, Ikeler, Parker, R. E., Mrs. Hollowell.
Alexander	Aug. 2	Taylorsville	French, Pate, Holmes, Mrs. Hutt.
Alleghany	Sept. 29	Whitehead	Parker, T. B., Gray, Dan, Mrs. Robinson.
	Sept. 30	Glade Valley	Parker, T. B., Gray, Dan, Mrs. Robinson.
	Sept. 30	Sparta	Parker, T. B., Gray, Dan, Mrs. Robinson.
Anson	July 31	Ansonville	Garren, Arey, Mrs. Garren, Mrs. Banks.
	Aug. 18	Morven	Garren, Arey, Mrs. Garren, Mrs. Banks.
Ashe	Sept. 25	W. Jefferson	Parker, T. B., Gray, D. T., Mrs. Robinson.
	Sept. 27	Grassy Creek	Parker, T. B., Gray, D. T., Mrs. Robinson.
	Sept. 28	Scottsville	Parker, T. B., Gray, D. T., Mrs. Robinson.
Avery	Sept. 20	Banners Elk	Parker, T. B., Gray, D. T., Mrs. Robinson.
Beaufort	Jan. 28	Pungo S. H.	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
	Jan. 29	Pantego	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
	Feb. 2	Ransomville	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
	Feb. 8	Aurora	Garren, Rives, Mrs. Garren, Miss Scott.
	Feb. 9	Washington	Garren, Rives, Mrs. Garren, Miss Scott.
Buncombe	Aug. 11	Swannanoa Test Farm	Gray, J. M., McCracken, Mrs. Slagle.
Burke	Aug. 3	Mount Pleasant	French, Pate, Holmes, Mrs. Hutt.
Brunswick	Feb. 1	Mount Pisgah	Kerr, Hutt, Mrs. Hutt, Miss Ward.
	Feb. 2	Exum	Kerr, Hutt, Mrs. Hutt, Miss Ward.
Cabarrus	Aug. 13	Winecoff S. H.	French, Pate, Parker, R. E., Mrs. Hutt.
	Aug. 13	Poplar Tent S. H.	French, Pate, Parker, R. E., Mrs. Hutt.
	Aug. 14	Reimer S. H.	French, Pate, Parker, R. E., Mrs. Hutt.
	Aug. 14	Rocky River S. H.	French, Pate, Parker, R. E., Mrs. Hutt.
Caldwell	Aug. 5	Granite Falls	French, Pate, Holmes, Mrs. Hutt.
	Aug. 6	Oak Hill	French, Pate, Holmes, Mrs. Hutt.
	Aug. 7	Patterson School	French, Pate, Holmes, Mrs. Hutt.
Camden	Jan. 22	Camden C. H.	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
Carteret	Feb. 2	Newport	Garren, Rives, Mrs. Garren, Miss Scott.

INSTITUTES, 1915—Continued.

County	Date	Place	Lecturers
Caswell.....	July 23	Leasburg.....	Sherman, Ikeler, Parker, R. E., Mrs. Hollowell.
	July 24	New Hope S. H.....	Sherman, Ikeler, Parker, R. E., Mrs. Hollowell.
Catawba.....	Aug. 4	Dr. Foard's Store.....	French, Pate, Holmes, Mrs. Hutt.
	Aug. 9	St. James School.....	French, Pate, Parker, R. E., Mrs. Hutt.
	Sept. 18	Lenoir College.....	Parker, T. B., Gray, D. T., Mrs. Robinson.
Chatham.....	July 21	Siler City.....	French, Pate, Mrs. Hutt.
Cherokee.....	Aug. 6	Andrews.....	Gray, McCracken, Mrs. Slagle.
Chowan.....	Jan. 23	Edenton.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
Clay.....	Aug. 4	Ogden S. H.....	Gray, J. M., McCracken, Bowditch, Mrs. Slagle.
	Aug. 5	Hayesville.....	Gray, J. M., McCracken, Bowditch, Mrs. Slagle.
Cleveland.....	Aug. 9	Shelby.....	Garren, Arey, Mrs. Garren.
	Aug. 10	Casar.....	Garren, Arey, Mrs. Garren.
Columbus.....	Feb. 3	Old Doek.....	Kerr, Hutt, Mrs. Hutt, Miss Ward.
	Feb. 4	Bolton.....	Kerr, Hutt, Mrs. Hutt, Miss Ward.
	Feb. 5	Hallsboro.....	Kerr, Hutt, Mrs. Hutt, Miss Ward.
	Feb. 6	Fair Bluff.....	Kerr, Hutt, Mrs. Hutt, Miss Ward.
	Feb. 8	Mount Tabor.....	Kerr, Hutt, Mrs. Hutt, Miss Ward.
	Feb. 9	Chadbourne.....	Kerr, Hutt, Mrs. Hutt, Miss Ward.
Craven.....	Feb. 3	Beech Grove.....	Garren, Rives, Mrs. Garren, Miss Scott.
	Feb. 4	Vanceboro.....	Garren, Rives, Mrs. Garren, Miss Scott.
Cumberland....	Jan. 20	Stedman.....	Kerr, Hutt, Mrs. Hutt, Miss Ward.
Currituck.....	Jan. 18	Currituck C. H.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
	Jan. 19	Newbern's Landing.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
Davidson.....	July 27	Kennedy S. H.....	French, Pate, Holmes, Mrs. Hutt.
	July 28	Reeds.....	French, Pate, Holmes, Mrs. Hutt.
	July 29	Freedonia S. H.....	Garren, Arey, Mrs. Garren, Mrs. Banks.
Davie.....	Aug. 6	Jerusalem.....	Sherman, Curtis, Parker, R. E., Mrs. Hollowell.
	Aug. 7	Cana Academy.....	Sherman, Curtis, Parker, R. E., Mrs. Hollowell.
Duplin.....	Jan. 26	Calypso.....	Garren, Rives, Mrs. Garren, Miss Scott.
	Jan. 28	Concord.....	Garren, Rives, Mrs. Garren, Miss Scott.
Durham.....	Aug. 18	Lowe's Grove School.....	Parker, R. E., Pate, Mrs. Hutt.
	Aug. 19	Mineral Springs H. S.....	Parker, R. E., Pate, Mrs. Hutt.
Edgecombe.....	Feb. 6	Speed.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
	Feb. 15	Dixie S. H.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
Forsyth.....	Aug. 10	Clemmons.....	Sherman, Holmes, Jerdan, Mrs. Hollowell.
	Aug. 11	Burke's Grove.....	Sherman, Holmes, Jerdan, Mrs. Hollowell.
	Aug. 13	Belew's Creek.....	Sherman, Holmes, Jerdan, Mrs. Hollowell.
Gaston.....	Aug. 7	Sunnyside S. H.....	Garren, Arey, Mrs. Garren.
	Aug. 11	Stanley.....	Garren, Arey, Mrs. Garren.
Gates.....	Feb. 8	Gatesville.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
Guilford.....	July 23	Pleasant Garden.....	French, Pate, Mrs. Hutt.
	July 29	McLeansburg.....	Sherman, Ikeler, Parker, R. E., Mrs. Hollowell.
	July 30	Battleground.....	Sherman, Ikeler, Parker, R. E., Mrs. Hollowell.
Halifax.....	Feb. 11	Enfield.....	Garren, Rives, Mrs. Garren, Miss Scott.
	Feb. 12	Aurelian Springs.....	Garren, Rives, Mrs. Garren, Miss Scott.
Harnett.....	Jan. 14	Lillington.....	Kerr, Hutt, Mrs. Hutt, Miss Ward.
	Jan. 15	Turlington.....	Kerr, Hutt, Mrs. Hutt, Miss Ward.
Haywood.....	Aug. 9	Rock Hill S. H.....	Gray, J. M., McCracken, Mrs. Slagle.
	Aug. 10	Rock Spring S. H.....	Gray, J. M., McCracken, Mrs. Slagle.
	Aug. 11	Bethel H. S.....	Gray, J. M., McCracken, Mrs. Slagle.
Henderson.....	Aug. 17	Green River.....	Gray, J. M., McCracken, Mrs. Slagle.
	Aug. 18	Dana.....	Gray, J. M., McCracken, Mrs. Slagle.
Hertford.....	Feb. 9	Ahoskie.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
	Feb. 10	Murfreesboro.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
Hoke.....	July 23	Raeford.....	Garren, Arey, Mrs. Garren, Mrs. Banks.
Hyde.....	Jan. 30	Swan Quarter.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
	Feb. 1	Sladeville.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.

INSTITUTES, 1915—Continued.

County	Date	Place	Lecturers
Iredell.....	July 30	Farm Life School.....	French, Pate, Holmes, Mrs. Hutt.
	July 31	Test Farm.....	French, Pate, Holmes, Mrs. Hutt.
	Aug. 10	Linwood S. H.....	French, Pate, Parker, R. E., Mrs. Hutt.
Jackson.....	Aug. 3	Cullowhee School.....	Gray, J. M., McCracken, Mrs. Slagle.
Johnston.....	Jan. 22	Kenly.....	Garren, Rives, Mrs. Garren, Miss Scott.
	Feb. 16	Pleasant Hill.....	Kerr, Hutt, Mrs. Hutt, Miss Ward.
Lee.....	July 21	Lee C. H.....	Garren, Arey, Parker, T. B., Mrs. Garren, Mrs. Banks.
Lincoln.....	Aug. 5	Reepsville.....	Garren, Arey, Mrs. Garren, Mrs. Robinson.
	Aug. 6	Lincolnton.....	Garren, Arey, Mrs. Garren, Mrs. Robinson.
Macon.....	Aug. 24	Maxwell School.....	Gray, J. M., McCracken, Mrs. Slagle.
	Aug. 25	Otto.....	Gray, J. M., McCracken, Mrs. Slagle.
	Aug. 26	Higdonville.....	Gray, J. M., McCracken, Mrs. Slagle.
Madison.....	Aug. 12	Marshall.....	Gray, J. M., McCracken, Mrs. Slagle.
	Aug. 13	Mars Hill.....	Gray, J. M., McCracken, Mrs. Slagle.
McDowell.....	Aug. 2	Marion.....	Garren, Arey, Mrs. Garren, Mrs. Robinson.
Martin.....	Jan. 15	Oak City.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
	Feb. 4	Williamston.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
Mecklenburg ...	Aug. 12	Dixie.....	Garren, Arey, Mrs. Garren.
	Aug. 12	Huntersville.....	French, Pate, Parker, R. E., Mrs. Hutt.
	Aug. 13	Carolina Academy.....	Garren, Arey, Mrs. Garren.
Mitchell.....	July 24	Bakersville.....	Parker, T. B., Gray, D. T., Mrs. Maddy, Mrs. Robinson.
	July 26	Spruce Pine.....	Parker, T. B., Gray, D. T., Mrs. Maddy, Mrs. Robinson.
Montgomery ...	July 27	Troy.....	Garren, Arey, Mrs. Garren, Mrs. Banks.
	July 28	Mount Gilead.....	Garren, Arey, Mrs. Garren, Mrs. Banks.
Moore.....	July 22	Carthage.....	Garren, Arey, Mrs. Garren, Mrs. Banks.
	July 21	Aberdeen.....	Garren, Arey, Mrs. Garren, Mrs. Banks.
	July 26	West End.....	Garren, Arey, Mrs. Garren, Mrs. Banks.
Nash.....	Jan. 19	Stanhope.....	Garren, Rives, Mrs. Garren, Miss Scott.
	Jan. 20	Nashville.....	Garren, Rives, Mrs. Garren, Miss Scott.
Northampton...	Feb. 11	Conway.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
	Feb. 13	Lasker.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
Onslow.....	Jan. 30	Harris Creek S. H.....	Garren, Rives, Mrs. Garren, Miss Scott.
	Feb. 1	Richlands.....	Garren, Rives, Mrs. Garren, Miss Scott.
Pamlico.....	Feb. 5	Arapahoe.....	Garren, Rives, Mrs. Garren, Miss Scott.
	Feb. 6	Trent.....	Garren, Rives, Mrs. Garren, Miss Scott.
Pasquotank...	Jan. 20	Elizabeth City.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
	Jan. 21	Salem.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
Pender.....	Jan. 29	Willard.....	Garren, Rives, Mrs. Garren, Miss Scott.
Person.....	July 21	Hurdle Mills.....	Sherman, Ikeler, Parker, R. E., Mrs. Hollowell.
	July 22	Roxboro.....	Sherman, Ikeler, Parker, R. E., Mrs. Hollowell.
Pitt.....	Jan. 16	Ayden.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
	Feb. —	Bethel.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
Polk.....	Aug. 19	Columbus.....	Gray, J. M., McCracken, Mrs. Slagle.
Randolph.....	July 22	Pleasant Ridge.....	French, Pate, Mrs. Hutt.
	July 26	Farmer.....	French, Pate, Mrs. Hutt.
Richmond.....	Aug. 19	Rockingham.....	Garren, Arey, Mrs. Garren.
Robeson.....	Jan. 18	Lumber Bridge.....	Kerr, Hutt, Mrs. Hutt, Miss Ward.
	Jan. 19	Philadelphus.....	Kerr, Hutt, Mrs. Hutt, Miss Ward.
	Feb. 10	Fairmont.....	Kerr, Hutt, Mrs. Hutt, Miss Ward.
	Feb. 11	Pembroke.....	Kerr, Hutt, Mrs. Hutt, Miss Ward.
	July 26	Reidsville.....	Sherman, Ikeler, Parker, R. E., Mrs. Hollowell.
Rowan.....	Aug. 11	Mount Ulla.....	French, Pate, Parker, R. E., Mrs. Hutt.
Rutherford.....	Aug. 16	China Grove.....	French, Pate, Parker, R. E., Mrs. Hutt.
	Aug. 18	Woodleaf.....	Sherman, Holmes, Jordan, Mrs. Hollowell.
	Aug. 3	Union Mills.....	Garren, Arey, Mrs. Garren, Mrs. Robinson.
	Aug. 4	Walls S. H.....	Garren, Arey, Mrs. Garren, Mrs. Robinson.

INSTITUTES, 1915—Continued.

County	Date	Place	Lecturers
Sampson.....	Jan. 27	Beulah.....	Garren, Rives, Mrs. Garren, Miss Scott.
	Jan. 21	Piney Green.....	Kerr, Hutt, Mrs. Hutt, Miss Ward.
	Jan. 22	Roseboro.....	Kerr, Hutt, Mrs. Hutt, Miss Ward.
Stanly.....	Jan. 23	Garland.....	Kerr, Hutt, Mrs. Hutt, Miss Ward.
	July 29	Norwood.....	French, Pate, Holmes, Mrs. Hutt.
	July 30	Endy S. H.....	Garren, Arey, Mrs. Garren, Mrs. Banks.
Stokes.....	Aug. 17	Richfield.....	French, Pate, Parker, R. E., Mrs. Hutt.
	Aug. 5	Walnut Cove.....	Sherman, Parker, R. E., Cutris, Mrs. Hollowell.
	Aug. 12	Dillard.....	Sherman, Parker, R. E., Jerdan, Mrs. Hollowell.
Surry.....	Aug. 14	Piney Grove Ch.....	Sherman, Holmes, Jerdan, Mrs. Hollowell.
	Aug. 16	Antioch S. H.....	Sherman, Holmes, Jerdan, Mrs. Hollowell.
	Aug. 17	Pilot Mountain.....	Sherman, Holmes, Jerdan, Mrs. Hollowell.
Swain.....	Aug. 7	Bryson City.....	Gray, J. M., McCracken, Millsaps, Mrs. Slagle.
Transylvania.....	Aug. 16	Blantyre.....	Gray, J. M., McCracken, Millsaps.
Tyrrell.....	Jan. 26	Columbia.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
Union.....	Aug. 14	Indian Trail.....	Garren, Arey, Broom, Mrs. Garren.
	Aug. 16	Waxhaw.....	Garren, Arey, Broom, Mrs. Garren.
	Aug. 17	Marshville.....	Garren, Arey, Broom, Mrs. Garren.
Vance.....	Feb. 15	Townsville.....	Garren, Rives, Mrs. Garren, Miss Scott.
	Feb. 16	Bobbitt.....	Garren, Rives, Mrs. Garren, Miss Scott.
Wake.....	Jan. 18	Zebulon.....	Garren, Rives, Mrs. Garren, Miss Scott.
	Oct. 5	Olive's Chapel.....	Parker, T. B., Gray, D. T., Hudson, Mrs. Maddry.
Warren.....	Feb. 13	Norlina.....	Garren, Rives, Mrs. Garren, Miss Scott.
Washington.....	Jan. 25	Mackeys.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
	Jan. 27	Creswell.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
	Feb. 3	Plymouth.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
Watauga.....	Sept. 23	Boone.....	Parker, T. B., Gray, D. T., Mrs. Robinson.
	Sept. 21	Valle Cruces.....	Parker, T. B., Gray, D. T., Mrs. Robinson.
	Sept. 22	Sugar Grove.....	Parker, T. B., Gray, D. T., Mrs. Robinson.
Wayne.....	Jan. 14	Rosewood.....	Garren, Rives, Mrs. Garren, Miss Scott.
	Jan. 15	Falling Creek.....	Garren, Rives, Mrs. Garren, Miss Scott.
	Jan. 16	Seven Springs.....	Garren, Rives, Mrs. Garren, Miss Scott.
	Jan. 23	Memorial Church.....	Garren, Rives, Mrs. Garren, Miss Scott.
	Jan. 25	Smith's Chapel.....	Garren, Rives, Mrs. Garren, Miss Scott.
Wilkes.....	Aug. 2	Clingmans S. H.....	Sherman, Ikeler, Parker, R. E., Mrs. Hollowell.
	Aug. 3	Millers Creek.....	Sherman, Ikeler, Parker, R. E., Mrs. Hollowell.
	Aug. 4	Beaver Creek.....	Sherman, Ikeler, Parker, R. E., Mrs. Hollowell.
	Oct. 1	Trap Hill.....	Parker, T. B., Gray, D. T., Mrs. Robinson.
Wilson.....	Jan. 14	Stantonsburg.....	French, Bulluck, Mrs. Robinson, Mrs. Slagle.
	Jan. 21	Rock Ridge.....	Garren, Rives, Mrs. Garren, Miss Scott.
Yadkin.....	Aug. 9	Yadkinville.....	Sherman, Holmes, Jerdan, Mrs. Hollowell.
Yancey.....	July 27	Bald Creek.....	Parker, T. B., Gray, D. T., Mrs. Maddry, Mrs. Robinson.

LECTURERS AND SUBJECTS.

Name	Number Places	Subjects
AREY, J. A., Assistant in Dairy Extension.....	26	Dairy Farming. Livestock Farming.
BANKS, Mrs. ROSA	10	Pastries, Cakes, etc. Jellies and Preserves.
BOWDITCH, E. D., Demonstrator	2	Demonstration Work
BROOM, T. J. W.	3	Winter Cover Crops. Clovers.
BULLUCK, J. D.	33	Soil Improvement. Drainage.
CURTIS, R. S.	2	Live Stock

LECTURERS AND SUBJECTS—Continued.

Name	Number Places	Subjects
FRENCH, A. L., Farmer	49	Grain Culture. Soil Improvement by Live Stock. Farm Management. Grass for Soil Building.
GARREN, G. M.	54	Fertilizers for Wheat and Various Soils. Legumes.
GARREN, MRS. G. M.	52	Clubs. Sanitation. Household Expenses and Economics.
GRAY, DAN T., Chief Division of Animal Industry.	17	Hog Feeding Experiments. Beef Cattle. Adapting Crops to Farms. Wintering Cattle.
GRAY, JAMES M.	18	Soil Improvement. Corn Culture. Forage Crops. The Home Garden.
HOLLOWELL, MRS. W. R.	24	Organization. Care of Infants. Problems of the Home.
HOLMES, J. S., State Forester	19	Care of the Forests. Care of the Wood Lot.
HUDSON, C. R., State Demonstration Agent	1	Demonstration and Intensified Culture.
HUTT, W. N., State Horticulturist	19	Commercial Orchards.
HUTT, MRS. W. N.	43	Balanced Human Ration—Food, Babies. Practical Sanitation.
IKELER, K. C.	12	The Dairy Cow and Type. Live Stock and Soil Improvement.
JERDAN, A. L.	9	Dairy Cattle. Live Stock.
KERR, J. P., Farmer	20	Sudan Grass. Poultry.
MCCRACKEN, R. P., Farmer	17	Beef Cattle. Drainage. Grasses.
MADDRY, MRS. C. E.	5	Health. Care and Abuse of the Body. Economy and Conveniences.
MILLSAPS, E. S., District Demonstration Agent	2	Alfalfa. Demonstration Work.
PARKER, R. E.	25	Birds and Their Protection.
PARKER, T. B., Director of Farmers' Institutes	19	Cultivation of Crops. Soil and Soil Improvement.
PATE, W. F.	21	Humus and Lime. Poultry. Fertilizers.
RIVES, J. R., Farmer	26	
ROBINSON, MRS. JOHN	43	Bread, Milk and Butter. Cooking for the Sick. Organizations.
SCOTT, MISS MARGARET	29	Home Canning
SHERMAN, FRANKLIN, State Entomologist	24	Insects and Their Control. Spraying Orchards. Insect Pests and Spraying.
SLAGLE, MRS. J. H.	45	Woman and the Home. Care of the Teeth and Cleanliness. Canning and Recipes.
WARD, MISS JANE T.	18	Household Conveniences and Economics.

County and Local Farmers' and Women's Institute Organizations

Institute committees are appointed in all the counties where institutes are held. The duties of the members of the committees are to suggest places where the institutes are to be held, topics for discussion, advertise the meetings, look after the comfort of those attending the meetings, see that the house or hall in which the institute is to be held is put in good order before the hour for the institute to meet.

Farmers' clubs, local Farmers' Alliances, and local Farmers' Unions can greatly help the institutes by coöperating with the local institute committees and the conductor of the institute party. Such coöperation is welcomed.

CHAIRMEN OF COUNTY INSTITUTES.

County	Men	Women
Alamance.....	C. F. Cates, Mebane.....	Mrs. C. F. Cates, Mebane.
Elon College.....	W. D. Walker, Burlington.....	Mrs. D. W. Wagoner, Burlington.
Spring Graded School.....	E. P. Dixon, Saxapahaw.....	Mrs. Lenora McBane, Snow Camp.
Alexander.....	J. C. Bell, Taylorsville.....	Mrs. H. C. Payne, Taylorsville.
Alleghany.....	W. L. Edwards, Whitehead.....	Mrs. F. W. Cheek, Whitehead.
Anson:		
Ansonville.....	W. W. Carpenter, Ansonville.....	Mrs. J. M. Dunlap, Ansonville.
Morven.....	W. A. Niven, Morven.....	Mrs. C. W. Ratliff, Morven.
Ashe:		
West Jefferson.....	F. R. Rich, Beaver Creek.....	Mrs. J. C. Gambill, West Jefferson.
Grassy Creek.....	S. G. Parsons, Grassy Creek.....	Mrs. S. G. Parsons, Grassy Creek.
Bellevue Academy.....	J. K. Taylor, Furches.....	Mrs. E. B. Shepherd, Scottsville.
Avery.....		Mrs. R. L. Lowe, Banners Elk.
Beaufort.....	J. D. Grimes, Washington.....	Mrs. Ben Bishop, Washington.
Bath.....	W. B. Archbell, Bath.....	
Pungo.....	J. B. Harris, Pungo.....	Mrs. Carrie Allen, Pungo.
Aurora.....		Mrs. T. M. Beacham, Aurora.
Pantego.....		Mrs. H. R. Way, Belhaven.
Ransomville.....		Mrs. Alice Respass, Ransomville.
Bertie.....	Josiah Brown, Colerain.....	
Bladen.....	R. B. Cromartie, Clarkton.....	Mrs. G. L. Clark, Clarkton.
Brunswick.....	Jack Johnson, Winnabow.....	Mrs. D. S. Henry, Winnabow.
Bolivia.....	A. T. Danford, Bolivia.....	
Exum.....	W. B. Edwards, Exum.....	Mrs. S. K. Mintz, Millbranch.
Southport.....	T. M. Thompson, Southport.....	Mrs. R. W. Davis, Southport.
Mount Pisgah.....	O. B. Sellers, Supply.....	Mrs. G. W. Kirby, Supply.
Buncombe.....	Allen Coggin, Swannanoa.....	
Burke.....	Capt. W. B. Berry, Morganton.....	Mrs. W. B. Berry, Morganton.
Cabarrus.....	R. G. Goodman, Concord.....	Mrs. J. C. Black, Harrisburg.
Poplar Tent.....	A. D. Crisco, Concord.....	
Caldwell.....	G. M. Goforth, Lenoir.....	
Granite Falls.....	R. C. Abernethy, Granite Falls.....	Mrs. D. M. Parlier, Granite Falls.
Oak Hill.....	D. C. Flowers, Lenoir.....	Mrs. E. H. Kirby, Lenoir.
Patterson School.....		Miss Mora Steele, Yadkin Valley.
Camden.....	W. G. Ferebee, Gregory.....	Mrs. W. G. Ferebee, Gregory.
Carteret.....	D. N. McCain, Newport.....	Miss Nettie Fodrie, Newport.
Caswell.....	J. F. Walters, Blanch.....	Miss Bessie Thompson, Leasburg.
Leasburg.....	W. S. Dixon, Leasburg.....	Mrs. L. B. Moore, Blanche.
Catawba:		
Dr. Foard's Store.....	Henry Killian, Hickory.....	Mrs. Gordon Wilfong, Newton.
St. James.....	D. E. Sigman, Newton.....	Mrs. W. F. Moore, Newton.
Lenoir College.....		Mrs. D. P. Setzer, Hickory.
Chatham.....	J. R. Paschal, Siler City.....	Mrs. O. B. Webster, Siler City.
Cherokee.....	G. B. Walker, Andrews.....	
Murphy.....	B. M. Ledford, Ranger.....	
Andrews.....	D. W. Whisenhunt, Andrews.....	
Chowan.....	W. T. Evans, Tyner.....	Mrs. J. A. Boyce, Edenton.
Clay.....	Z. T. Bumgarner, Hayesville.....	
Ogden.....	G. R. Ford, Hayesville.....	
Cleveland.....	A. P. Spoke, Shelby.....	Mrs. Frank Elam, Cleveland Mills.
Casar.....	A. A. Warlick, Casar.....	Mrs. Della Richards, Casar.
Columbus.....	G. H. Thompson, Chadbourn.....	Mrs. E. B. Bailey, Chadbourn.
Old Dock.....	C. W. Suggs, Old Dock.....	Miss Ruby Hughes, Old Dock.
Bolton.....	Dr. S. A. Smith, Bolton.....	Mrs. J. S. Strauss, Bolton.
Hallsboro.....	J. A. Wyche, Hallsboro.....	Mrs. Thos. Brown, Hallsboro.
Fairbluff.....	C. W. Shelley, Cerro Gordo.....	Mrs. Henry Coleman, Cerro Gordo.
Tabor.....	Mimos Meares, Tabor.....	Mrs. Viola Carmichael, Tabor.

CHAIRMEN OF INSTITUTE COMMITTEES—Continued.

County	Men	Women
Craven:		
Vanceboro.....	O. McLawhorne, Vanceboro.....	
Beach Grove.....	G. T. Richardson, New Bern.....	
Ernul.....	D. P. Whitford, Askin.....	
Cumberland.....	R. S. Autry, Stedman.....	Mrs. R. S. Autry, Stedman.
King Hiram.....	J. H. Smith, Hope Mills.....	Miss P. M. Pool, Hope Mills.
Currituck.....	J. J. Ferebee, Shawboro.....	Mrs. E. M. Walker, Currituck.
Newbern's Landing.....		Mrs. W. H. Brock, Newbern's Landing.
Davidson:		
Kennedy S. H.....	D. S. Hayworth, High Point.....	Mrs. L. E. Bird, Thomasville.
Reeds.....	C. H. Fritts, Lexington.....	Miss Marguerite Robinson, Lex- ington.
Freedonia S. H.....	Stokes Smith, Newsom.....	Mrs. D. M. Feezor, Linwood.
Davie.....	M. J. Hendricks, Cana.....	Mrs. M. J. Hendricks, Cana.
Duplin.....	J. A. Shine, Faison.....	
Calypso.....	J. T. Albritton, Mount Olive.....	Mrs. Z. D. McWhorter, Calypso.
Faison.....	H. J. Faison, Faison.....	
Concord.....		Mrs. A. L. Usher, Rose Hill.
Durham:		
Mineral Springs.....	A. C. Weatherly, Gorman.....	Mrs. J. T. Hicks, Durham.
Lowe's Grove.....	J. C. High, Durham.....	Miss Beulah Arey, Durham.
Edgecombe.....	G. T. DeBerry, Tarboro.....	Mrs. B. B. Howell, Tarboro.
Dixie S. H.....		Mrs. J. L. Dupree, Rocky Mount.
Conetoe.....	N. B. Dawson, Conetoe.....	
Whitakers.....	O. K. Taylor, Whitakers.....	
Speed.....	B. F. Shelton, Speed.....	
Forsyth.....	A. B. Atwood, Winston-Salem.....	
Clemmons.....	T. W. Griffith, Clemmons.....	Miss Eliza Douthit, Clemmons.
Burke's Grove.....	P. E. Burke, Winston-Salem, No. 2.	Mrs. James Alsbaugh, Winston- Salem.
Belwe's Creek.....	J. E. Sapp, Belwe's Creek.....	Mrs. J. E. Sapp, Belwe's Creek.
Gaston.....	E. D. Thompson, Stanley.....	Mrs. Ed. Kennedy, Bessemer City.
Sunny-side S. H.....	H. S. Sellers, Kings Mountain.....	
Gates.....	W. J. Boone, Drum Hill.....	Mrs. J. F. Wiley, Gates.
Eure.....	T. E. Story, Eure.....	
Granville.....	E. G. Moss, Creedmoor.....	
Greene.....	W. R. Dixon, Snow Hill.....	
Grimsley's Chapel.....	J. T. Dixon, Farmville.....	
Guilford:		
Pleasant Garden.....	C. T. Weatherly, Greensboro.....	Mrs. J. C. Rose, Pleasant Garden.
McLeansville.....	W. J. Boone, McLeansville.....	Mrs. Jacob Clapp, S. dalia.
Battleground.....	J. G. Frazier, Guilford College.....	Mrs. Emma Joyner, Battleground.
Halifax.....	G. W. Bryan, Scotland Neck.....	
Littleton.....	Claude Sessoms, Littleton.....	
Aurlian Springs.....	J. R. Patterson, Littleton.....	Mrs. Rufus Bradley, Aurlian Spgs.
Harnett.....	C. McArtan, Lillington.....	
Turlington.....	L. L. Turlington, Duke.....	Mrs. L. L. Turlington, Duke.
Haywood.....	Dr. G. D. Green, Waynesville.....	
Rock Hill.....	B. P. Howell, Waynesville.....	
Rock Springs.....	A. C. Walker, Clyde.....	
Bethel.....	M. D. Kinsland, Bethel.....	
Henderson:		
Green River.....	Cannon Andrews, Zirconia.....	
Dana.....	P. T. Ward, Flat Rock.....	
Hertford:	W. P. Shaw, Winton.....	
Ahoskie.....	A. E. Garrett, Ahoskie.....	Mrs. J. W. Mitchell, Ahoskie.
Murfreesboro.....	J. J. Parker, Murfreesboro.....	Miss Mattie Liverman, Murfrees- boro.

CHAIRMEN OF INSTITUTE COMMITTEES—Continued.

County	Men	Women
Hoke.....	J. A. McPhaul, Shannon.....	Mrs. T. B. Upchurch, Raeford.
Hyde.....	Chas. Brinn, Swan Quarter.....	Mrs. O. S. Howard, Swan Quarter.
Sladesville.....	Z. T. Fortescue, Scranton.....	Mrs. G. L. Swindell, Scranton.
Iredell.....	R. W. Pou, Elmwood.....	
Harmony.....	G. W. Beaty, Harmony.....	Mrs. F. H. Stafford, Harmony.
Linwood.....	T. J. Williams, Mooresville.....	Mrs. J. C. Templeton, Troutmans.
Jackson.....	J. T. Cooper, Whittier.....	
Johnston:		
Pleasant Hill.....	Julian Godwin, Benson.....	Mrs. J. Willis Creech, Benson.
Kenly.....	L. B. Boyette, Kenly.....	Mrs. W. E. Atkinson, Kenly.
Jones.....	T. C. Whitaker, Trenton.....	
Pollocksville.....	A. H. White, Pollocksville.....	
Lee.....	J. R. Rives, Sanford.....	Mrs. J. H. Henly, Sanford.
Lenoir.....	G. F. Loftin, Kinston.....	
LaGrange.....	J. E. Jones, LaGrange.....	
Lincoln.....	T. J. Ramsaur, Lincolnnton.....	Mrs. J. C. Lowe, Lincolnnton.
Reepsville.....	W. C. Kiser, Reepsville.....	Mrs. W. C. Kiser, Reepsville.
McDowell.....	T. W. Wilson, Nealsville.....	Mrs. S. L. Long, Old Fort.
Macon.....	Arthur Siler, Franklin.....	
Wests Mills.....	John Dalton, Wests Mills.....	
Otto.....	W. C. Smart, Otto.....	
Higdonville.....	J. P. Moore, Ellijay.....	
Madison.....	L. P. Bryan, Marshall.....	
Mars Hill.....	A. F. Sprinkle, Mars Mill.....	
Martin.....	P. R. Rives, Robersonville.....	
Oak City.....	N. M. Worsley, Oak City.....	Mrs. J. L. Hynes, Oak City.
Mecklenburg:		
Huntersville.....	A. B. McAuley, Huntersville.....	Mrs. W. J. Ransom, Huntersville.
Dixie.....	B. T. Price, Charlotte, No. 4....	Mrs. Sam Stowe, Charlotte.
Carolina Academy.....	R. M. Bryant, Matthews, No. 17..	Mrs. W. E. Cunningham, Fort Mill, S. C.
Mitchell.....	Chas. L. McNeal, Bandana.....	Mrs. Nora Anderson, Bakersville.
Spruce Pine.....		Mrs. T. A. English, Spruce Pine.
Montgomery.....	R. A. Bruton, Mount Gilead.....	Miss Anna Bruton, Mount Gilead.
Troy.....	O. B. Deaton, Troy.....	Miss Norma Burch, Troy.
Moore.....	T. D. McLean, Carthage.....	Miss Gracie Bradford, Carthage.
Aberdeen.....	J. R. Page, Aberdeen.....	Mrs. Chris. Page, Aberdeen.
West End.....	W. P. Cochran, West End.....	Mrs. Will Ferguson, Jackson Spgs.
Nash.....	S. F. Austin, Nashville.....	Mrs. Oscar Creech, Nashville.
Stanhope.....	S. H. Brantley, Springhope.....	Mrs. Robt. Ricks, Stanhope.
New Hanover.....	Wm. Gregerson, Castle Hayne.....	Mrs. E. J. Herring, Wilmington.
Northampton.....	J. W. Jessup, Rich Square.....	
Lasker.....	C. S. Lasker, Lasker.....	Mrs. J. J. Parker, Lasker.
Conway.....	J. O. Flythe, Conway.....	Mrs. G. R. Freeman, Conway.
Olney.....	D. H. Brown, George.....	Miss Lovella Brown, George.
Onslow.....	Dr. J. L. Nicholson, Richlands.....	
Richlands.....	J. M. Francke, Richlands.....	Mrs. J. M. Francke, Richlands.
Harris Creek.....	H. R. Shepherd, Cyrus.....	Miss Elda Walton, Jacksonville.
Orange.....	A. H. Rimmer, Hillsboro.....	
Pamlico.....	G. T. Farnell, Bayboro.....	
Arapahoe.....		Miss Ethel Brinson, Grantsboro.
Trent.....		Miss Sadie Spruill, Oriental.
Pasquotank.....	R. N. Morgan, Elizabeth City.....	Mrs. R. N. Morgan, Elizabeth City.
Weeksville.....	H. M. Pritchard, Weeksville.....	Mrs. S. J. Parsons, Weeksville.
Pender.....	Geo. J. Moore, Atkinson.....	Mrs. Will Lewis, Atkinson.
North East S. H.....	W. J. Saunders, Burgaw.....	Miss Veta Saunders, Burgaw.
Willard.....	J. H. Jefferies, Willard.....	Mrs. J. H. Jefferies, Willard.
Perquimans.....	J. O. White, Hertford.....	

CHAIRMEN OF INSTITUTE COMMITTEES—Continued.

County	Men	Women
Person	J. T. Hawkins, Hurdle Mills	Mrs. R. B. Millburn, Hurdle Mills.
Warrens Grove	C. B. Brooks, Roxboro	Miss Kate Wienn, Roxboro.
Pitt	J. F. Evans, Greenville	
Grifton	J. P. Quinerly, Grifton	
Grimesland	H. J. Smith, Grimesland	
Ayden		Mrs. J. E. Sawyer, Ayden.
Bethel		Mrs. W. H. Woodard, Bethel.
Polk	A. T. Hart, Tryon	
Randolph		
Pleasant Ridge	Hugh Parks, Franklinville	Mrs. Willard Brown, Ramseur.
Farmer	Will Lester, Mechanic	Mrs. F. P. Hubbard, Farmer.
Richmond	W. C. Leak, Rockingham	
Ellerbe	E. L. Pegram, Ellerbe	
Robeson		
Lumber Bridge	Robt. Monroe, Lumber Bridge	Mrs. Thos. Stamps, Lumber Bridge.
Red Springs	J. F. McCoy, Red Springs	Miss Katie Bonie, Red Springs.
Fairmont	N. T. Andrews, Fairmont	Mrs. E. B. Hayes, Fairmont.
St. Paul	G. M. D. Howard, St. Paul	Mrs. E. G. Johnson, St. Paul.
Rockingham	J. L. McCollum, Madison	Mrs. Will Cummings, Reidville.
Bethany S. H.		Mrs. Claude McCullum, Summerfield.
Rowan		
Mount Ulla	J. K. Goodman, Mount Ulla	
China Grove	A. W. Winecoff, Salisbury	
Woodleaf	I. T. Bailey, Woodleaf	Mrs. Ross Lysterly, Woodleaf.
Rutherford	G. S. Harrill, Ellenboro.	
Wall S. H.	C. F. Walker, Bostie	Miss Fannie Tate, Bostie.
Sampson	S. H. Hobbs, Clinton	Mrs. T. A. Davis, Clinton.
Piney Green	C. H. McLamb, Huntley	Mrs. J. T. McLamb, Huntley.
Roseboro	D. W. Culbreth, Roseboro	
Garland	J. D. Johnson, Garland	Mrs. J. D. Johnson, Garland.
Stanly	S. J. Lentz, Norwood	Mrs. J. C. Dunkap, Norwood.
Richfield	E. D. Coggins, Richfield	Mrs. P. R. Misenheimer, Richfield.
Endy S. H.	J. L. Whitney, Mount Pleasant	Mrs. Mary Efird, Big Lick.
Stokes	J. Wilson Mitchell, Dillard	Mrs. Addie Mitchell, Dillard.
Walnut Cove		Mrs. A. M. Tuttle, Walnut Cove.
Surry	J. E. Dodson, Pilot Mountain	
Piney Grove Ch.	J. A. Blue, White Plains	Mrs. L. B. Smith, White Plains.
Antioch Ch.	J. W. Johnson, Mount Airy	Mrs. J. W. Johnson, Mount Airy.
Swain	A. M. Fry, Bryson City	
Transylvania	P. J. Woodfin, Blantyre	
Tyrrell	W. W. Sawyer, Columbia	Mrs. J. L. Woodley, Columbia.
Union		
Indian Trail	J. E. Broom, Matthews	Mrs. J. E. Broom, Matthews.
Waxhaw	J. R. Eason, Waxhaw	Mrs. T. M. Crow, Waxhaw.
Marshville	B. H. Griffin, Marshville	Mrs. L. L. Greene, Marshville.
Vance	J. B. Allen, Henderson	Mrs. P. J. Allen, Henderson.
Wake	W. H. Chamblee, Jr., Zebulon	
Clemmons Academy	J. T. Sheron, Wake Forest	Mrs. M. Z. Pearce, Wake Forest.
Olive's Chapel	A. T. Olive, Apex, No. 3	Mrs. W. S. Olive, Apex.
Warren	H. T. Macon, Warrenton	Miss Lucie Webb, Warren Plains.
Washington	T. W. Blount, Roper	
Creswell	W. T. Hopkins, Creswell	Mrs. C. N. Davenport, Creswell.
Watauga	T. C. Baird, Valle Crucis	Mrs. Finley Mast, Valle Crucis.
Sugar Grove	A. J. Johnson, Sherwood	Mrs. D. C. Mast, Sugar Grove.
Wayne	J. M. Mitchell, Goldsboro	
Rosewood	John S. Davis, Goldsboro	Mrs. John S. Davis, Goldsboro.
Pikeville	E. T. Crawford, Pikeville	
Smith Chapel	W. B. Hood, Mount Olive	Mrs. Jas. Smith, Mount Olive.
Falling Creek	G. M. Warrick, Goldsboro, No. 4	Mrs. Sid. Grantham, Goldsboro.

CHAIRMEN OF INSTITUTE COMMITTEES—Continued.

County	Men	Women
Memorial Church.....	C. D. Hooks, Fremont.....	Mrs. C. D. Hooks, Fremont.
Seven Springs.....	G. G. Quinn, Seven Springs.....	Mrs. W. G. Parks, Seven Springs.
Wilkes.....	A. G. Hendren, Straw.....	
Clingman School.....	T. F. Calloway, Ronda.....	Miss Letitia Martin, Ronda.
Millers Creek.....	W. T. Kilby, Millers Creek.....	Mrs. Sarah Tulburt, Millers Creek.
Beaver Creek.....	T. J. Jones, Ferguson.....	Mrs. W. H. Ferguson, Ferguson.
Wilson.....	E. B. Dean, Wilson.....	
Rock Ridge.....		Miss Annie Boyette, Wilson.
Stantonsburg.....		Mrs. B. J. Thompson, Stantonsburg.
Yadkin.....	M. W. Mackie, Yadkinville.....	Mrs. M. L. Mackie, Yadkinville.
Yancey.....	E. F. Watson, Burnsville.....	Mrs. J. L. Ray, Burnsville.
Bald Creek.....	C. L. McPeters, Bald Creek.....	Mrs. W. B. Wilson, Bald Creek.

State Farmers' Convention

ROGER A. DERBY, *President*, Jackson Springs, N. C.

T. E. BROWNE, *Secretary*, West Raleigh, N. C.

Women's Convention

MRS. JAMES G. BOYLIN, *President*, Wadesboro, N. C.

MRS. MARGARET SCOTT SMITH, *Secretary*, Raleigh, N. C.

LEAF TOBACCO REPORT FOR NOVEMBER, 1915.

Pounds sold for producers.....	39,249,071
Pounds sold for dealers.....	2,678,559
Pounds sold for warehouses.....	3,047,733
	<hr/>
Total	44,975,363

THE BULLETIN
OF THE
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE
RALEIGH

Vol. 37, No. 2

FEBRUARY, 1916

Whole No. 217

DIVISION OF AGRONOMY



REPORT ON VARIETY TESTS OF COTTON
FOR 1915

PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Postoffice at Raleigh, N. C., as second class matter,
February 7, 1901, under Act of June 8, 1900.

EDWARDS & BROUGHTON PRINTING CO.
STATE PRINTERS

STATE BOARD OF AGRICULTURE

W. A. GRAHAM, Commissioner, *ex officio* Chairman, Raleigh.

F. P. LATHAM.....	Belhaven.....	First District.
C. W. MITCHELL.....	Aulander.....	Second District.
R. L. WOODARD.....	Pamlico.....	Third District.
CLARENCE POE.....	Raleigh.....	Fourth District.
R. W. SCOTT.....	Haw River.....	Fifth District.
A. T. McCALEM.....	Red Springs.....	Sixth District.
C. C. WRIGHT.....	Hunting Creek.....	Seventh District.
WILLIAM BLEDSOE.....	Gale.....	Eighth District.
W. J. SHUFORD.....	Hickory.....	Ninth District.
A. CANNON.....	Horse Shoe.....	Tenth District.

OFFICERS AND STAFF

W. A. GRAHAM.....	Commissioner.
K. W. BARNES.....	Secretary and Purchasing Agent.
MISS SARAH D. JONES.....	Bookkeeper.
D. G. CONN.....	Bulletin Superintendent.
R. W. KILGORE.....	State Chemist, Director Test Farms.
J. M. PICKEL.....	Feed Chemist.
W. G. HAYWOOD.....	Fertilizer Chemist.
J. Q. JACKSON.....	Assistant Chemist.
E. S. DEWAR.....	Assistant Chemist.
E. B. HART.....	Assistant Chemist.
D. M. McCarty.....	Assistant Chemist.
F. C. WIGGINS.....	Assistant Chemist.
J. F. HATCH.....	Fertilizer Clerk.
R. W. COLLETT.....	Assistant Director Test Farms.
H. H. BRIMLEY.....	Curator of Museum.
T. W. ADICKES.....	Assistant Curator.
FRANKLIN SHERMAN, Jr.....	Entomologist.
R. W. LEIBY.....	Assistant Entomologist.
S. C. CLAPP.....	Assistant Entomologist in Field Work.
B. B. FLOWE.....	Veterinarian.
H. P. FLOWE.....	Assistant Veterinarian.
E. G. HARGETT.....	Assistant Veterinarian.
W. N. HUTT.....	Horticulturist.
R. G. HILL.....	Assistant Horticulturist.
C. D. MATTHEWS.....	Assistant Horticulturist.
T. B. PARKER.....	Director of Farmers' Institutes.
W. M. ALLEN.....	Chemist and Chief, Division Food and Oil Inspection.
E. W. THORNTON.....	Assistant Chemist, Division Food and Oil Inspection.
C. E. BELL.....	Assistant Chemist, Division Food and Oil Inspection.
LELAND B. RHODES.....	Assistant Chemist, Division Food and Oil Inspection.
C. B. WILLIAMS.....	Chief, Division of Agronomy.
J. K. PLUMMER.....	Soil Chemist.
W. F. PATE.....	Agronomist in Soils.
R. Y. WINTERS.....	Plant Breeding.
W. E. HEARN.....	State Soil Agent, Soil Survey.
L. L. BRINKLEY.....	Soil Survey.
H. D. LAMBERT.....	Soil Survey.
J. L. BURGESS.....	Agronomist and Botanist.
C. H. WALDRON.....	Assistant Agronomist and Botanist.
MISS LOUISE A. RADEMACHER.....	Assistant to Botanist.
MISS ALMA L. STONE.....	Assistant to Botanist.
DAN T. GRAY.....	Chief in Animal Industry.
R. S. CURTIS.....	Associate in Animal Industry.
W. H. EATON.....	Dairy Experimentor.
ALVIN J. REED.....	Dairy Farming.
STANLEY COMBES.....	Assistant in Dairy Farming.
I. A. AREY.....	Assistant in Dairy Farming.
F. R. FARNHAM.....	Assistant in Dairy Farming.
F. T. PEDEN.....	Beef Cattle.
HA. L. JERDAN.....	Beef Cattle.
HB. P. FOLK.....	Pig Clubs.
EARL HOSTETLER.....	Assistant in Beef Cattle and Swine.
HA. G. OLIVER.....	Poultry Clubs.
HE. H. MATHEWSON.....	Tobacco Investigations.
HC. R. HUDSON.....	Farm Demonstration Work.
HT. E. BROWNE.....	Assistant in Charge of Boys' Clubs.
HA. K. ROBERTSON.....	Assistant in Boys' Clubs.
MISS JANE S. MCKIMMON.....	Assistant in Charge Girls' Clubs.
MISS M. L. JAMISON.....	Assistant in Home Economics.

C. E. CLARK, Assistant Director Edgecombe Test Farm, Rocky Mount, N. C.

F. T. MEACHAM, Assistant Director Iredell Test Farm, Statesville, N. C.

JOHN H. JEFFERIES, Assistant Director Pender Test Farm, Willard, N. C.

S. F. DAVIDSON, Assistant Director Transylvania and Buncombe Test Farms, Swannanoa, N. C.

E. G. MOSS, Assistant Director Granville Test Farm, Oxford, N. C.

*Assigned by the Bureau of Soils, United States Department of Agriculture.

†Assigned by the Bureau of Animal Husbandry, United States Department of Agriculture.

‡In co-operation with Bureau of Plant Industry, United States Department of Agriculture.

LETTER OF TRANSMITTAL

RALEIGH, N. C., February 16, 1916.

HON. W. A. GRAHAM,
Commissioner of Agriculture.

SIR:—I herewith transmit the report on the results of the tests of varieties of cotton during the past year, and recommend that it be published as February, 1916, BULLETIN of the Department.

Respectfully submitted,
C. B. WILLIAMS,
Chief, Division of Agronomy.

Approved for printing:
W. A. GRAHAM,
Commissioner.

REPORT ON VARIETY TESTS OF COTTON FOR 1915

BY R. Y. WINTERS AND V. R. HERMAN.

COTTON VARIETY TESTS.

Cotton varieties have been tested on three experiment farms of the State for thirteen years. More than one hundred different varieties have been studied in these tests. The varieties are fair representatives of the most productive long-staple upland and short-staple varieties grown in the cotton states. Three varieties have been compared during the entire thirteen years and several have been compared during periods of five years.

Results from a one, or even two, year test may be misleading on account of the mixed condition and poor care given most of our cotton seed. The fact that a variety yields highest in one test does not prove it to be the best variety in the test. Some varieties have yielded well one year and poorly the next. Varieties which never lead the test may, by consistent yielding from year to year, produce a higher average yield than a variety which leads the test one year. In recent years our most consistent varieties have been those which have received some care in their breeding and handling. A variety which gives a consistently good yield is worth more than one which fluctuates from good to poor. The way to be sure of a good variety is to improve it by selecting good seed in the community where it is to be grown.

RESULTS OF THE TEST IN 1915.

During the past season forty-four varieties of cotton have been tested. Twenty-four varieties were secured out of the State and twenty came from points within the State. A special effort was made to secure representative varieties from the different sections of the State. All of the varieties were included in the test at Raleigh; but only the most promising for those sections have been included at the Iredell and Edgecombe farms. For instance, the long-staple and big-boll varieties require a longer season than is usually had at the Iredell farm. For this reason only the early varieties were grown there. At the Edgecombe farm, where the season is longer, our best results have been gotten from the large and medium boll, short-staple varieties and the early long-staple cottons. The results at this farm have been omitted from this report on account of the irregular stand. A portion of the plats were destroyed by root lice.

THE EXPERIMENT STATION FARM.

The cotton varieties were planted in a field of sandy clay loam located about two miles west of Raleigh. The test contained seven long-staple and thirty-seven short-staple varieties. Check rows of Culpepper were included after each ten rows of varieties.

Among the varieties were Cleveland Big Boll from five sources, and strains of King from six sources. The Cleveland strains ranged in yield between 452 and 531 pounds of lint per acre. With the exception of two strains, they were quite different in size of plant, shape of leaves, size of bolls and quality of staple. The King strains ranged in yield between 1,058 and 1,417 pounds of seed cotton per acre, a difference of 359 pounds between the lowest and highest. All of these strains showed mixtures, and four were very different in habit of growth, shape of leaves and size of bolls. The results represent conditions which might exist in any variety so generally grown as Cleveland Big Boll and King. Variety names may be misleading unless we secure our seed from known sources.

The following tables contain a list of the varieties and data arranged according to yield of lint and seed per acre:

TABLE I—VARIETIES OF SHORT-STAPLE COTTON GROWN IN 1915, RANKED ACCORDING TO YIELD OF LINT AND SEED PER ACRE.

EXPERIMENT STATION FARM

Variety and Source of Seed	Yield of Seed Cotton, Pounds Per Acre	Pounds of Seed Cotton, First-Picking	Yield of Lint, Pounds Per Acre	Yield of Seed, Pounds Per Acre	Percent of Lint	Length of Staple	Actual Number of Stalks Per Plat	Number of Stalks for Perfect Stand, Per Plat
Simpkins Ideal,								
P. H. Roscherry, Wilmington, N. C.	1,417	377.9	524.3	892.7	37	7½	204	175
Cleveland Big Boll,								
T. P. Hanrick, Shelby, N. C.	1,267	261.5	531.8	765.2	41	7½	187	175
Cook,								
Alabama Experiment Station, Auburn, Ala.	1,228	340.1	528.0	760.0	43	7½	174	175
Cleveland Big Boll,								
Modern Seed Farm, St. Matthews, S. C.	1,247	327.5	498.8	748.2	40	1	206	175
Cleveland Big Boll,								
Excelsior Seed Farm, Shelby, N. C.	1,260	377.8	491.4	768.6	39	7½+	173	175
Improved King,								
North Carolina A. and M. College, West Raleigh, N. C.	1,278	428.2	472.9	805.1	37	7½+	182	175
Hite's Early Prolific,								
W. T. Hite, Augusta, Ga.	1,260	466.0	466.0	794.0	37	7½	215	175
Sunbeam,								
W. T. Dennis, Ellberton, Ga.	1,215	264.5	473.9	711.1	39	7½	174	175
Simpkins Ideal,								
W. A. Simpkins, Raleigh, N. C.	1,234	403.0	468.9	765.1	38	7½	130	175
Crawford Improved,								
T. A. Crawford, Williston, Tenn.	1,247	390.4	461.4	785.6	37	7½	170	175
Cleveland 433,								
Alabama Experiment Station, Auburn, Ala.	1,222	440.8	464.4	757.6	38	7½	150	175
Sugar Loaf,								
Sugar Loaf Seed Farm, Youngsville, N. C.	1,228	327.4	454.4	773.6	37	7½	173	175
Cleveland X Cook,								
Alabama Experiment Station, Auburn, Ala.	1,221	579.4	452.9	771.1	37	7½	163	175
Cleveland Big Boll,								
W. T. Brooks, Arlington, Ga.	1,222	440.8	452.1	769.9	37	7½	171	175
Jones Improved,								
R. B. Jones, Butler, Ga.	1,083	466.0	454.8	628.2	42	7½	210	175

TABLE I—CONTINUED.

Variety and Source of Seed	Yield of Seed of Cotton, Pounds Per Acre	Pounds of Seed of Cotton, Per Acre, First Picking	Yield of Lint, Pounds Per Acre	Yield of Seed, Pounds Per Acre	Percent of Lint	Length of Staple	Actual Number of Stalks, Per Plat	Number of Stalks for Perfect Stand, Per Plat
Dixie Wilt Resistant.								
J. A. Russell, Society Hill, S. C.	1,144	352.7	446.2	697.8	39	7½	140	175
Culpepper Re-improved.								
J. E. Culpepper, Lutherville, Ga.	1,199	383.3	431.4	767.6	36	1	165	175
Culpepper's Improved.								
Station Farm, West Raleigh, N. C.	1,166	352.6	431.4	734.6	37	7½	187	175
Improved King.								
L. D. McPherson, Fayetteville, N. C.	1,146	226.7	435.5	710.5	38	7½—	203	175
Simpkins Ideal.								
J. E. Wiggins, Sunbury, N. C.	1,124	291.5	438.4	685.6	39	7½	150	175
Covington-Toole.								
W. F. Covington, Headland, Ala.	1,203	516.4	421.4	781.6	35	7½	187	175
Hawkins Extra Prolific.								
B. W. Hawkins, Eatonton, Ga.	1,152	491.2	414.7	737.3	36	7½	186	175
Improved Keenan.								
J. W. Ballard, Hayne, N. C.	1,124	478.6	116.0	708.0	37	1	168	175
Perry's Improved.								
Miley Perry, Raleigh, N. C.	1,058	466.0	423.2	634.8	40	7½	164	175
Brown No. 1.								
M. L. Brown, Decatur, Ga.	1,074	314.9	397.4	676.6	37	1	156	175
Trice.								
J. F. Bridger, Bells, Tenn.	1,089	554.2	392.0	697.0	36	7½	156	175
Straughn.								
I. Cana Poole, Clayton, N. C.	1,089	403.0	381.2	707.8	35	7½	172	175
Thigpen Prolific.								
I. L. Thigpen, Conetoe, N. C.	1,071	604.6	374.9	636.1	35	7½	197	175
Ricks Improved.								
R. H. Ricks, Rocky Mount, N. C.	1,071	415.6	374.9	696.1	35	7½	155	175
Express.								
J. F. Bridger, Bells, Tenn.	1,014	415.0	375.2	638.8	37	7½+	142	175

Triumph, R. T. Malone, Capleville, Tenn.....	1,014	277.0	375.2	638.8	37	7 1/4 +	141	175
Sunbeam, J. W. Grande, Washington, Ga.....	1,045	302.3	365.8	679.2	35	1	185	175
Allen Multiplier, N. J. Allen, Clayton, N. C.....	1,052	327.5	357.7	694.3	34	7 1/8	145	175
Mexican Big Boll, J. D. Hope, Sharon, N. C.....	995	478.6	358.2	636.8	36	7 1/8 +	159	175
Simpkins Big Boll Early, J. E. Wiggins, Sunbury, N. C.....	982	541.0	353.5	628.5	36	7 1/8	171	175
Simpkins Big Boll Early, W. A. Simpkins, Raleigh, N. C.....	926	503.8	361.1	564.9	39	7 1/8	142	175
Shine's Early Prolific, J. A. Shine, Fuison, N. C.....	964	466.0	347.0	617.0	36	7 1/8	161	175

*Staple too short to be classed among the long staple varieties.

TABLE II—VARIETIES OF LONG-STAPLE COTTON GROWN IN 1915, RANKED ACCORDING TO YIELD OF LINT AND SEED PER ACRE.
EXPERIMENT STATION FARM.

Variety and Source of Seed	Yield of Seed, Cotton, Pounds Per Acre	Pounds of Seed of Cotton, Per Acre, First Picking	Yield of Lint, Pounds Per Acre	Yield of Seed, Pounds Per Acre	Percent of Lint	Length of Staple	Actual Number Stalks, Per Plat	Number of Stalks for Perfect Stand, Per Plat
Polk, L. C. Hollman, Clarksdale, Miss.	1,297	491.2	467.0	830.0	36	1½	209	175
Webber 49, Pedigreed Seed Co., Hartsville, S. C.	1,228	466.0	442.0	786.0	36	1½	180	175
Keenan, W. B. Loranee, Columbia, S. C.	1,182	390.4	413.7	768.3	35	1½	186	175
Keenan (Goodson), Pedigreed Seed Co., Hartsville, S. C.	1,124	491.2	401.6	719.4	36	1½	168	175
Lewis Long Staple, E. P. Lewis, Gastonia, N. C.	1,197	491.2	383.0	814.0	32	1½	158	175
Allen's Early, J. B. Allen, Port Gibson, Miss.	1,121	390.4	392.4	728.6	35	1½	146	175
Webber 82, Pedigreed Seed Co., Hartsville, S. C.	976	365.3	331.8	644.2	34	1½	99	175

The short- and long-staple varieties have been grouped in separate tables, but may be compared with each other direct, since all of the varieties received the same treatment.

THE IREDELL TEST FARM.

The Iredell Test Farm is located at Statesville, near the western and northern limit of the cotton-growing area of the State. The varieties were planted on a uniform field of Cecil clay, April 10. On account of the short season only the early short-staple varieties were included in this test.

The following table includes the varieties and data arranged according to yield of lint and seed per acre:

TABLE III—VARIETIES OF SHORT-STAPLE COTTON GROWN IN 1915, RANKED ACCORDING TO YIELD OF LINT AND SEED PER ACRE.
IREDELL TEST FARM.

Variety and Source of Seed	Yield of Seed Cotton, Pounds Per Acre	Pounds of Seed Cotton, Per Acre, First picking	Yield of Lint, Pounds Per Acre	Yield of Seed, Pounds Per Acre	Percent of Lint	Length of Staple	Actual Number of Stalks, Per Plat	Number of Stalks for Perfect Stand, Per Plat
Trico.								
J. F. Bridger, Bells, Tenn.	1,261	1,164.2	454.9	807.0	36	7 $\frac{1}{2}$ +	510	566
Sugar Loaf.								
Sugar Loaf Seed Farm, Youngsville, N. C.	1,183	905.5	437.7	745.3	37	7 $\frac{1}{2}$ +	590	566
Simpkins Ideal.								
W. A. Simpkins, Raleigh, N. C.	915	836.2	356.8	558.2	39	7 $\frac{1}{2}$	559	566
Improved King.								
Iredell Test Farm, Statesville, N. C.	901	831.6	342.4	558.6	38	7 $\frac{1}{2}$	503	566
Perry's Improved.								
Miley Perry, Raleigh, N. C.	832	702.2	316.1	515.9	38	7 $\frac{1}{2}$ —	490	566
Simpkins Ideal.								
J. E. Wiggins, Sunberry, N. C.	804	720.7	313.6	490.4	39	7 $\frac{1}{2}$ —	540	566
Simpkins Ideal.								
P. H. Roseberry, Wilmington, N. C.	740	666.2	273.8	466.2	37	7 $\frac{1}{2}$	459	566
Allen's Multiplier.								
N. J. Allen, Clayton, N. C.	753	683.8	263.5	489.5	35	3 $\frac{1}{2}$ +	531	566
Thigpen Prolific.								
I. L. Thigpen, Conetoe, N. C.	684	572.9	246.2	437.8	36	7 $\frac{1}{2}$ +	509	566
Improved King.								
L. H. McPherson, Fayetteville, N. C.	656	591.4	242.7	413.3	37	7 $\frac{1}{2}$	557	566
Hawkins Extra Prolific.								
B. W. Hawkins, Eatonton, Ga.	638	526.7	229.6	408.4	36	7 $\frac{1}{2}$ +	654	566
Shine's Early Prolific.								
J. A. Shine, Faison, N. C.	653	400.0	222.0	431.0	34	7 $\frac{1}{2}$ +	624	566
Cleveland Big Boll.								
T. P. Hamrick, Shelby, N. C.	601	443.5	228.2	372.8	38	1	453	566
Ilite's Early Prolific.								
W. T. Hite, Augusta, Ga.	573	405.0	223.6	349.4	39	7 $\frac{1}{2}$	599	566

Triumph, R. T. Malone, Capleville, Tenn.....	527	378.8	191.9	332.1	37	7%+	448	566
Improved King, A. & M. College, West Raleigh, N. C.	490	397.3	186.2	303.8	38	7%	561	566
Jones' Improved, R. B. Jones, Butler, Ga.....	485	101.9	194.0	291.0	40	7%	570	566
Dixie Wilt Resistant, J. A. Russell, Society Hill, S. C.....	480	304.9	187.2	292.8	39	7%	609	566
Straughn, I. Cana Poole, Clayton, N. C.....	501	318.8	176.4	327.6	35	7%+	449	566
Crawford's Improved, T. A. Crawford, Williston, Tenn.....	416	334.9	153.9	262.1	37	7%+	416	566
Covington-Toole, W. F. Covington, Headland, Ala.....	370	221.8	110.6	229.4	38	7%	499	566

SUMMARY OF THE COTTON VARIETY TESTS.

Forty-four cotton varieties were tested on the Experiment Station Farm during the past season. Of this number 37 are short-staple and 7 long-staple varieties. The short-staple varieties ranged in yield between 964 and 1,417 pounds of seed cotton per acre, a difference of 453 pounds between the lowest and the highest yielding variety. This represents a difference in money value of about \$24, which is about the cost of producing an acre of cotton under average conditions. The long-staple varieties ranged in yield between 976 and 1,297 pounds of seed cotton per acre, a difference of 321 pounds between the lowest and highest yielding variety. It should be noted in this connection that the highest yielding strains produced a shorter fiber.

In a comparison of five strains of Cleveland Big Boll and six strains of King it was found that strains of the same variety may differ in character of plant, size of boll, shape of leaf and yield. Variety names are, therefore, not safe guides to good seed. The best way to be sure of a good strain is to select good seed in the community where they are to be grown.

The variety test at the Iredell farm contained twenty-one short-staple varieties of cotton. These included the earliest medium boll and the small boll varieties. In yielding capacity these varieties range between 370 and 1,261 pounds of seed cotton per acre, a difference of 891 pounds per acre. This represents a difference in money value of about \$40 per acre.

PLANS FOR IMPROVING OUR COTTON VARIETIES.

The Experiment Station is now coöperating with organized groups or communities of cotton growers for the purpose of improving the yield and quality of cotton grown in the State. Two communities have already started the work, and a third has just been organized. The work can be done by any organized community of cotton growers.

The best variety of cotton for a community is one that has been chosen on account of its merits, and then further improved by selecting seed from its best plants. With this in mind, the first part of the work consists of a variety test to determine the best variety for the community. The best varieties in the community are grown along with a few promising varieties from other sources. These varieties are grown for comparison on one or more farms of the community. They are tested in a field where each variety may have the same amount of fertilizer and cultivation. Some member of the Experiment Station staff will take notes at intervals during the growing period and at harvest time. At harvest time each variety is picked separately and carefully weighed. With the aid of the notes and data on yield and quality of lint, the growers of the community choose the variety that is to be grown and improved.

When the variety is chosen the work of improvement begins. One farm of the community is selected for the breeding work. The plant-to-row method of breeding is used and the work is continued in co-operation with the Experiment Station until one or more growers of the community are familiar with the value and principles of breeding good seed.

LEAF TOBACCO REPORT FOR DECEMBER, 1915.

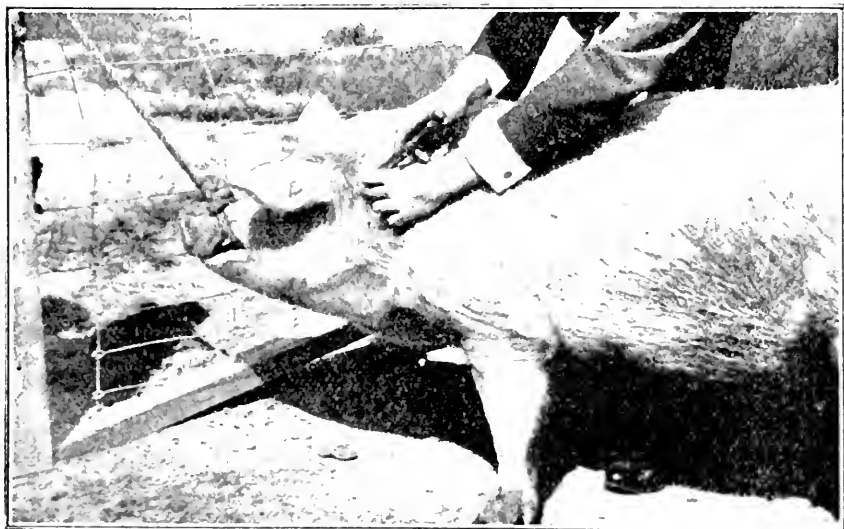
Pounds sold for producers.....	25,383,177
Pounds sold for dealers.....	1,804,693
Pounds sold for warehouses.....	1,907,742
	<hr/>
Total	29,095,612

THE BULLETIN
OF THE
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE
RALEIGH

Vol. 37, No. 3

MARCH, 1916

Whole Number 218



Injecting Serum into Neck of Hog

**HOG CHOLERA AND ITS PREVENTION BY THE USE OF
ANTI-HOG CHOLERA SERUM**

PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Postoffice at Raleigh, N. C., as second class matter,
February 7, 1901, under Act of June 6, 1900.

EDWARDS & BROUGHTON PRINTING CO. RALEIGH, N. C.

STATE BOARD OF AGRICULTURE

W. A. GRAHAM, Commissioner, *ex officio* Chairman, Raleigh.

F. P. LATHAM.....	Belhaven.....	First District.
C. W. MITCHELL.....	Aulander.....	Second District.
R. L. WOODARD.....	Pamlico.....	Third District.
CLARENCE POE.....	Raleigh.....	Fourth District.
R. W. SCOTT.....	Haw River.....	Fifth District.
A. T. McCALLUM.....	Red Springs.....	Sixth District.
C. C. WRIGHT.....	Hunting Creek.....	Seventh District.
WILLIAM BLEDSOE.....	Gale.....	Eighth District.
W. J. SHUFORD.....	Hickory.....	Ninth District.
A. CANNON.....	Horse Shoe.....	Tenth District.

OFFICERS AND STAFF

W. A. GRAHAM.....	Commissioner.
K. W. BARNES.....	Secretary and Purchasing Agent.
MISS SARAH D. JONES.....	Bookkeeper.
D. G. CONN.....	Bulletin Superintendent.
B. W. KILGORE.....	State Chemist, Director Test Farms.
J. M. PICKEL.....	Feed Chemist.
W. G. HAYWOOD.....	Fertilizer Chemist.
J. Q. JACKSON.....	Assistant Chemist.
E. S. DEWAR.....	Assistant Chemist.
E. B. HART.....	Assistant Chemist.
D. M. McCarty.....	Assistant Chemist.
F. C. WIGGINS.....	Assistant Chemist.
J. F. HATCH.....	Fertilizer Clerk.
R. W. COLLETT.....	Assistant Director Test Farms.
H. H. BRIMLEY.....	Curator of Museum.
T. W. ADICKES.....	Assistant Curator.
FRANKLIN SHERMAN, Jr.....	Entomologist.
R. W. LEBBY.....	Assistant Entomologist.
S. C. CLAPP.....	Assistant Entomologist in Field Work.
B. B. FLOWE.....	Veterinarian.
H. P. FLOWE.....	Assistant Veterinarian.
E. G. HARGETT.....	Assistant Veterinarian.
W. N. HUTT.....	Horticulturist.
R. G. HILL.....	Assistant Horticulturist.
C. D. MATTHEWS.....	Assistant Horticulturist.
T. B. PARKER.....	Director of Farmers' Institutes.
W. M. ALLEN.....	Chemist and Chief, Division Food and Oil Inspection.
E. W. THORNTON.....	Assistant Chemist, Division Food and Oil Inspection.
C. E. BELL.....	Assistant Chemist, Division Food and Oil Inspection.
LELAND B. RHODES.....	Assistant Chemist, Division Food and Oil Inspection.
C. B. WILLIAMS.....	Chief, Division of Agronomy.
J. K. PLUMMER.....	Soil Chemist.
W. F. PATE.....	Agronomist in Soils.
R. Y. WINTERS.....	Plant Breeding.
*W. E. HEARN.....	State Soil Agent, Soil Survey.
L. L. BRINKLEY.....	Soil Survey.
H. D. LAMBERT.....	Soil Survey.
J. L. BURGESS.....	Agronomist and Botanist.
C. H. WALDRON.....	Assistant Agronomist and Botanist.
MISS LOUISE A. RADEMACHER.....	Assistant to Botanist.
MISS ALMA I. STONE.....	Assistant to Botanist.
DAN T. GRAY.....	Chief in Animal Industry.
R. S. CURTIS.....	Associate in Animal Industry.
W. H. EATON.....	Dairy Experimenter.
†ALVIN J. REED.....	Dairy Farming.
STANLEY COMBES.....	Assistant in Dairy Farming.
†J. A. ARLY.....	Assistant in Dairy Farming.
F. R. FARNHAM.....	Assistant in Dairy Farming.
F. T. PEDEN.....	Beef Cattle.
†A. L. JERDAN.....	Beef Cattle.
†B. P. FOLK.....	Pig Clubs.
EARL HOSTETLER.....	Assistant in Beef Cattle and Swine.
†A. G. OLIVER.....	Poultry Clubs.
†E. H. MATHIASON.....	Tobacco Investigations.
†C. R. HUDSON.....	Farm Demonstration Work.
†T. E. BROWNE.....	Assistant in Charge of Boys' Clubs.
†A. K. ROBERTSON.....	Assistant in Boys' Clubs.
†MRS. JANE S. McKIMMON.....	Assistant in Charge Girls' Clubs.
MISS M. L. JAMISON.....	Assistant in Home Economics.

C. E. CLARK, Assistant Director Edgecombe Test Farm, Rocky Mount, N. C.

F. T. MEACHAM, Assistant Director Iredell Test Farm, Statesville, N. C.

JOHN H. JILLIGUES, Assistant Director Pender Test Farm, Willard, N. C.

S. F. DAVIDSON, Assistant Director Transylvania and Buncombe Test Farms, Swannanoa, N. C.

E. G. MOSS, Assistant Director Granville Test Farm, Oxford, N. C.

*Assigned by the Bureau of Soils, United States Department of Agriculture.

†Assigned by the Bureau of Animal Husbandry, United States Department of Agriculture.

‡In cooperation with Bureau of Plant Industry, United States Department of Agriculture.

LETTER OF TRANSMITTAL

HON. W. A. GRAHAM, *Commissioner of Agriculture.*

SIR:—I beg to submit herewith manuscript on Hog Cholera and its prevention by the use of anti-hog cholera serum. I recommend that this manuscript be published as the March BULLETIN.

B. B. FLOWE,
State Veterinarian.

Approved for publication.

W. A. GRAHAM,
Commissioner of Agriculture.

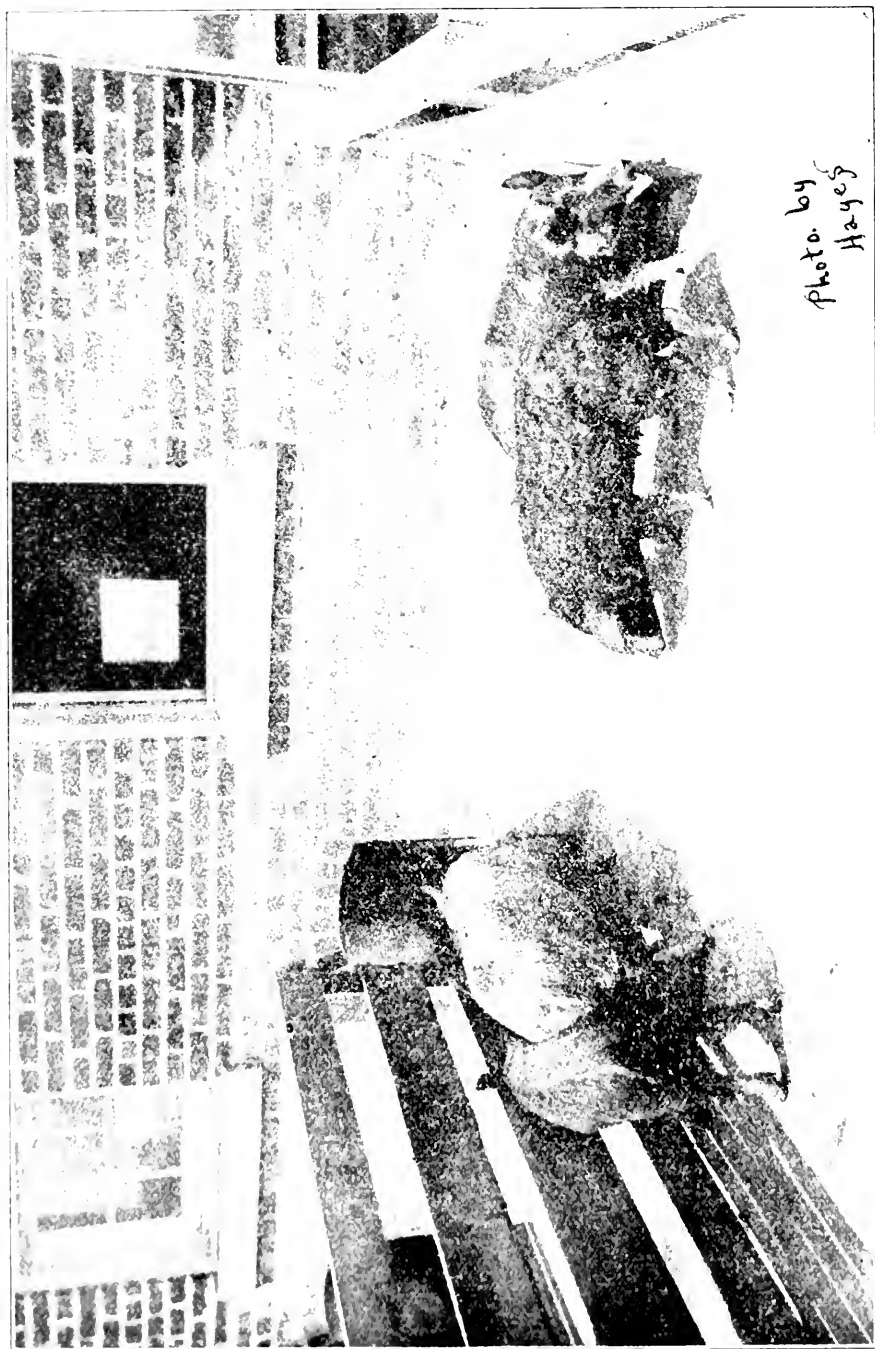


FIG. 2. Hogs affected with hog cholera

HOG CHOLERA

BY B. B. FLOWE, STATE VETERINARIAN.

Hog cholera is a highly contagious and infectious disease of hogs which, so far as is known, affects only hogs. It is characterized by its contagiousness and a very high death rate. It is usual to speak of this disease as either chronic or acute. This is because in some instances the disease is sudden at the onset and very rapid in its termination, which is usually death. In chronic cases the appearance of the disease is slower, and the affected animals may linger for weeks, and sometimes months, before they finally die or recover from the disease. However, the cause of the disease is the same, but the difference in appearance may be due to the high resisting power of the individual hog or to an attenuated virus.

Hog cholera is found in nearly all parts of the world. The first record of its outbreak in the United States was in Ohio, in 1833, since which time it has spread to all the large hog-raising states and to nearly all of the other state at some time or another. Some of the larger hog-raising states are losing more than three million dollars worth annually from this disease. The annual loss of hogs in the United States from this disease is estimated at the enormous sum of sixty million (\$60,000,000) dollars. The annual loss in North Carolina alone is estimated at considerably over three-quarters of a million dollars (\$750,000). This enormous loss is going on while many thousands of dollars are being sent out of the State annually for pork, lard and other meat products.

The first record we have of this disease occurring in North Carolina was in 1859, according to Commissioner Polk's report of 1879, which reads as follows:

"Before dismissing the subject of stock, I may mention an additional fact, developed by these returns, that operates seriously against our farmers, and that may be worthy the attention of our Legislature. I allude to the destruction of hogs by the epidemic known as cholera. Since its introduction into the State, in the year of 1859, it has continued its ravages, with more or less damage, defying all treatment. It has thus far baffled the researches of veterinary science, and is alike unrestrained by heat, cold, latitude or other local conditions. The number of hogs reported in the counties before mentioned is 917,266; the number reported as destroyed by disease during the year is 169,104—a little over 17 per cent of the whole number. We may safely assume that full returns of all the counties in the State would increase the loss to at least 200,000 hogs. It will thus be seen that from this source alone our people lose hundreds of thousands of dollars annually."

CAUSE OF HOG CHOLERA

The germ or microbe which causes hog cholera has never been cultivated in the laboratories, as has been with many other infectious germs. However, the germ or microbe is present in the blood of sick hogs and

also in the excretions from such hogs, particularly in the urine. It has been demonstrated time and again that the disease can be produced by injecting the blood or urine of a sick hog into a well one.

The germ, which is in the blood or urine, is either so small or of such structure that it cannot be seen with the strongest microscope now available. Therefore, the germ of hog cholera is classified with the "invisible micro-organisms." In this respect it resembles many other infectious diseases of animals and men.

The Predisposing Cause

The specific cause of hog cholera is the minute micro-organism just referred to, yet there are a number of things that tend to make the hog more susceptible. In fact anything which tends to lower the vitality of the animal may be regarded as predisposing causes. The following may be mentioned: insanitary condition of the hog lots, filthy drinking and feeding troughs, improper feed and feeding, damp or cold sleeping places, etc.

It is to be understood that insanitary conditions, improper feeding, and, in general, bad surroundings, cannot, within themselves, produce a case of hog cholera, as the disease is caused by a specific organism which must gain entrance into the body before a case of hog cholera is produced. But hogs of low vitality become comparatively easy victims of any disease-producing germs when exposed.

Period of Incubation

The period of incubation is the number of days between contracting the germ causing hog cholera, and the manifestation of the first symptoms or evidence of sickness. This time ranges from four to twenty-one days, depending on the susceptibility of the individual hog and the virulence of the infection.

An acute form of hog cholera indicates a virulent form of infection, while a slow or chronic form of hog cholera indicates an infection weak in virulency.

SYMPTOMS

A post-mortem and anti-mortem study of hog cholera will show a greater variety of symptoms than any other disease affecting hogs. For this reason, it is often hard for the farmer who has not had special training along this line to detect the first sick hog in his herd, and often a large per cent of his hogs are sick before he even suspects they are sick. Then not being able to detect the nature of the disease he does nothing until most of his hogs are sick and the first one to show any signs of being sick are beginning to die, when it is too late to do anything. So far, we know nothing that will cure an advanced case of hog cholera. Then, again, we see in some herds one or two hogs that contract a mild form of the disease and are off feed for a few days, but

soon recover. From these animals the entire herd may become infected, and this before cholera is even suspected.

In the chronic form we are more apt to be deceived, and this is especially so when there has been a previous outbreak of an acute form on the farm. This is so because in the chronic form the affected hogs will linger along for weeks and sometimes for more than a month before they finally die, or recover, as the case may be. But the acute form usually wipes the entire herd out within a short time after it first gains entrance in the herd.

Among the first symptoms seen in hogs affected with cholera is a loss of appetite, a tendency to hide in the litter or some secluded place and if forced to get up they show a stiffness in their gait, as if they had tender feet, and the back is usually more or less arched. At first there is a tendency towards constipation which is followed in a few days by a very fetid diarrhea. In light skin hogs, and at times in dark skin hogs, a red or purple discoloration of the skin can be detected along the belly between the fore legs and at the base of the ears. This symptom is not always present but is frequently seen. When cholera is suspected, it is well to secure a clinical thermometer and take the temperature of a number of those hogs that are eating and apparently well.

We frequently find in a herd where there has been one or more sick hogs for several days a number of the hogs apparently well showing a temperature as high as 104 to 107 degrees Fahrenheit, and even higher. Hogs affected with cholera will often carry these high temperatures from three to five days and appear to be entirely healthy, but are ready to come down with an acute form of cholera. The normal temperature of a hog is from 101 to 102 degrees Fahrenheit.

Owing to the high temperature, lack of appetite and general depression, vomiting, thumps, quick or jerky breathing is frequent. The mucopurulent secretion from the eyes often becomes so heavy that the eyelids are adhered together, causing the hog to become blind.

The most striking difference between the acute and chronic form of cholera is the duration of the disease. In the chronic form the temperature is not so high. The hog may continue to eat a little every day but becomes unthrifty and emaciated and may linger along in this condition for three or four weeks before dying. The acute form usually terminates in death between the eighth and fourteenth day.

When there is any doubt of the sick hogs being affected with cholera, a post-mortem examination should be made on one of the sick hogs in order to make an accurate diagnosis.

Post-Mortem Appearances

SKIN—A close examination of the skin will show red or purple spots along the belly, between the fore and hind legs and at the base of the ears; this is especially so in light skin hogs. In chronic cases the skin may

become dry and hard and slough out in places. The ears and tail may also slough off.

STOMACH—The mucous membrane or inner lining of the stomach may be very much inflamed and red, frequently showing evidence of ulcers.

LYMPHATIC GLANDS.—Enlarged, congested, showing hemorrhagic spots when cut open. Of these glands receiving special attention in hog cholera are the mesenteric glands, or those along the intestines; lumbar and retro-peritoneal are those lying near the back wall of the abdominal cavity;

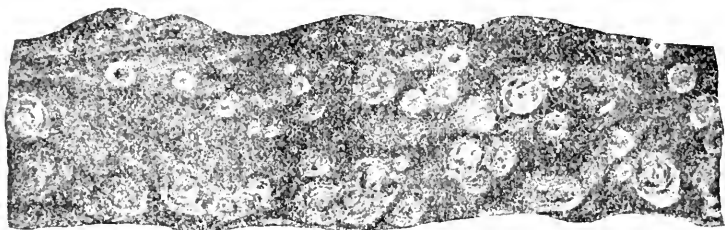


FIG. 3. Ulcers (large intestine), chronic form

the lymphatic glands found near the angle of the jaw; the mediastinal and bronchial glands in the region of the heart and lungs, and the inguinal glands found beneath the skin high upon the inside of the thigh.

INTESTINES—The inner lining, or the mucous membrane of the intestines, especially near the ileo-cecal valve, the place where the small intestine opens into the large intestine, may be congested and covered with small red spots. At this point in the intestine it is not uncommon to see ulcers varying in size and shape. One of the most constant is the somewhat circular button-shaped ulcer standing out from the surrounding mucous membrane, with a greenish-yellow center. The outer surface of

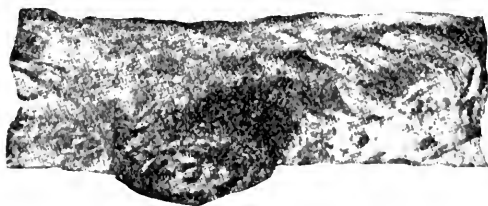


FIG. 4. Button Ulcers (large intestine), chronic form

the large and small intestines may be literally covered with bloody spots. Small greenish-yellow ulcers may be seen on the outer surface of both small and large intestines.

SPLEEN—Almost without exception, the spleen or "milt" is enlarged, dark and soft and covered with small red spots and easily ruptured.

KIDNEYS—When the capsule, or covering of the kidney is removed, dark red spots are seen. Frequently these hemorrhagic spots are so

numerous that it reminds one of the speckling of a turkey's egg. Congestion and hemorrhagic spots are also detected when the kidney is cut open.

BLADDER—The inner lining of the bladder may be found congested with numerous hemorrhagic spots on the surface.

HEART—Numerous petechiae and hemorrhagic spots may be found on the heart.

LUNGS—In well defined cases of cholera small red or hemorrhagic spots may be found on the lungs. Again large, dark, consolidated spots are found, due to congestion and collapse of the lung tissue. In the chronic form pus may be found in the lungs. Sometimes the lungs are adhered to the chest walls and diaphragm.

Symptoms Usually Found in Well-Defined Cases of Hog Cholera

ANTE-MORTEM—Lack of appetite, unthrifty, high temperature, emaciation, arched back, wobbling gait, red or purple skin along the belly between front and hind legs and base of ears, and constipation followed by diarrhea.

POST-MORTEM—Hemorrhagic spots on kidney, lung, intestinal lesions and congestion of lymphatic glands. Congested spleen studded with petechiae spots.

Infected Premises

The length of time before it is safe to put non-immune hogs on infected premises will depend largely upon the character of the grounds infected. If the grounds are well drained and are not covered with too much litter, so that the rays of the sun will reach all parts of the ground, it would probably be safe to add susceptible hogs to the premises in three months. But, if the grounds are not well drained and have low, wet or marshy places, it would not be safe to add susceptible hogs to the grounds under twelve months, or even longer. When conditions will permit every effort possible should be made to thoroughly disinfect the infected premises before hogs that are susceptible to cholera are added to the premises.

SANITATION

Under the ordinary farm conditions it is practically impossible to disinfect thorough enough to kill out all of the hog cholera infection, but where possible all litter should be raked up and burned. This can be done in small lots and should be followed with a spray of a five per cent solution of carbolic acid, lysol, creolin or any other reliable disinfectant, and a liberal application of lime. The pens and houses can be disinfected in a like manner; if they are inexpensive ones it would be better to tear them down and burn them. All mud holes and cesspools should be drained and filled up.

If these measures are followed one would most likely be safe in adding susceptible hogs to the premises. If the hog lots or pastures can be used



FIG. 5 Kidney showing typical lesions of hog cholera (hemorrhagic spots)

for any other purpose and new quarters can be found for the hogs, it would be much safer.

Susceptible hogs should be treated with anti-hog cholera serum if they are to be placed on the infected grounds under twelve months. Since it is practically impossible to thoroughly disinfect a large premise, the hogs should be immuned to cholera before they are allowed access to the infected grounds, but bear in mind it is always well to use disinfectants liberally around hog houses.

When cholera has broken out in a herd of hogs in a field, this field should be covered with a heavy application of lime, and a crop grown on it for one year before it is used again, unless the hogs are "immune."

SOME OF THE WAYS BY WHICH HOG CHOLERA IS SPREAD

It is well to bear in mind that every case of hog cholera comes from a previous case of cholera. It is impossible to produce a case of cholera without having the germs that cause hog cholera. No matter how filthy the lots or pens in which the hogs are kept, they cannot have cholera unless the germs from a previous case of cholera are introduced. The disease cannot arise spontaneously. All secretions and excretions are laden with the infection and if allowed to enter into a susceptible hog's system will produce cholera.

Since hog cholera must come from some previous case of cholera, it behooves us to see that the carcasses of all hogs dying from cholera are properly disposed of. The infected lots and pens should be held under strict quarantine. All cholera carcasses should be burned or buried deep and covered with lime. Cholera may be carried from an infected premise by dogs, cats, rabbits, crows, pigeons, buzzards, or any other animal that moves from one place to another.

The Turkey Buzzard

The turkey buzzard is one of the three worst agents by which hog cholera is disseminated in this State. The other two are free range, and running streams and overflows. Whenever the carcass of an animal is left on top of the ground, no matter what was the cause of death, the buzzards are certain to be attracted to the carcass. If the carcass is one of a cholera hog they feed upon it and fly away to some other farm, at times many miles away, and they are certain to carry the hog cholera germs with them. If these germs are deposited in reach of other hogs they are certain to cause an outbreak of cholera. The importance of burying all carcasses, especially all cholera carcasses and carcasses of other infectious diseases, cannot be emphasized too much.

For many years the turkey buzzard, or vulture, was protected by law in a great many states, as they were considered scavengers, but since it has been demonstrated that they are one of the worst agents we have in disseminating disease germs, especially the germ of hog cholera, and



FIG. 6. From group in State Museum (mounted by T. W. Adickes)
Buzzards feeding on cholera carcass

other disease-producing germs of live stock, a large number of these states have repealed this law, thereby permitting the destruction of the turkey buzzard.

The act protecting the turkey buzzard, or vulture, in North Carolina, was repealed by the Legislature of 1915.

Running Streams and Overflows

The infection can be carried for miles down a running stream. If infected hogs are allowed access to the stream of water running through the farm, the stream then becomes a source of disseminating the infection over a wide area. So it is not safe to allow hogs to have access to running streams that do not have their origin on the farm.

The overflows in the Eastern part of this State are a source of disseminating the infection over a wide area. Especially is this so where the dead hogs are not properly disposed of, or where the hogs die in the swamps and no attempt is made to locate and bury them.

Often hogs in the free-range territory die from cholera in a running stream or in large swamps and are never seen by their owners. These hogs serve as centers from which infection is scattered broadcast during overflows.

Public Roads

The public roads are another source of disseminating the infection. Sick hogs often have access to the public roads and leave them infected. It then becomes dangerous to drive well hogs on the public highway.

Show Hogs

Often hogs contract cholera at shows and when brought back to the farm and turned in the lots with the other hogs, become the agent by which the entire herd is infected. All hogs coming from the shows or new hogs being added to the herd should be held under quarantine at least three weeks before they are allowed to run with the other hogs.

Public Stock Yards

All public stock yards are infected with hog cholera germs. It is unsafe to purchase hogs from stock yards for breeding or feeding purposes. Nor should hogs intended for breeding or feeding purposes be unloaded in pens to be fed unless these pens are thoroughly disinfected. The cars in which the hogs are shipped should be thoroughly disinfected before the hogs are loaded. All hogs unloaded in public stock yards, not intended for immediate slaughter, should be treated with anti-hog cholera serum.

Infected Hogs Running at Large

In the territory where live stock run at large, we find a larger per cent of hog cholera. This is due to hogs affected with cholera coming in con-

tact with hogs from adjoining farms. In this way the infection is often spread from farm to farm.

VISITORS—Hog cholera infection can be carried on the shoes and clothes of people. It is unsafe for any one to visit an infected herd and return to their own or any other herd of hogs.

GARBAGE—Uncooked garbage from hotels, restaurants or other sources is dangerous. We know of no instance in this State where uncooked garbage has been fed for any length of time where cholera did not develop. Feed it only to immuned hogs or have it thoroughly cooked.

SUSCEPTIBILITY

Young pigs and young shoats are more susceptible than older hogs, but often we find the older hogs the first to succumb to the disease.

As to the susceptibility of the different breeds, we do not believe there is any difference. The "scrub" hog and "mule-footed hog" succumb to the disease as readily as the pure breeds.

MORTALITY

The mortality will vary in different localities and on different farms. When cholera first makes its appearance in a locality the per cent of deaths, as a rule, is higher than it is at the end of the outbreak. The same is also true in communities where cholera has appeared for a number of years in succession. The per cent of losses will range around fifty per cent in some localities; in others as high as ninety-five per cent. This depends on the virulency of infection and the susceptibility of the hogs.

As a rule hogs recovering from cholera are greatly depreciated in value. Unless the hogs are exceptionally valuable ones, it would be more economical to destroy and burn them when they have developed a well defined case of cholera.

THE SERUM PLANT

The State Department of Agriculture now owns and operates a modern and well-equipped serum plant. The plant consists of a serum laboratory, virus laboratory, virus hog house, hyper-immune hog house, and about twelve acres of ground devoted to hog lots. The Legislature of 1915 appropriated \$5,000 for the production of the serum and reduced the price from one and a fourth cents per cubic centimeter to three-fourths of a cent per cubic centimeter, thus reducing the cost of the serum to less than it cost to produce it.

ANTI-HOG CHOLERA SERUM

In order to make potent anti-hog cholera serum, it is necessary to select a hog that is "immune" to cholera. This hog is one that has been treated with serum and virus at least twenty-one days, or one that has

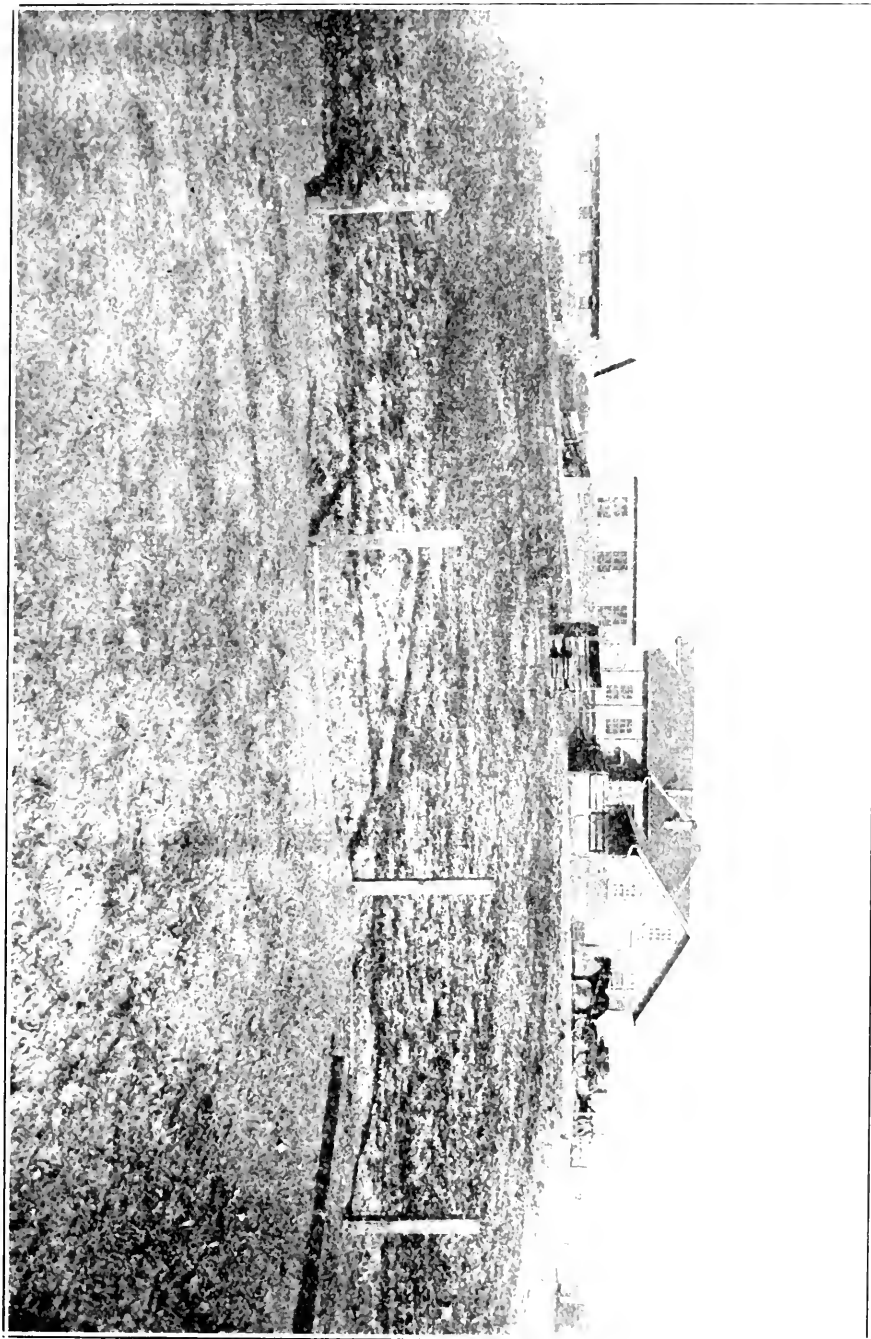


FIG. 7. View of serum plant



FIG. 8. Serum plant force

recovered from an attack of cholera. One attack of cholera confers life immunity. Into this "immune" hog five cubic centimeters of virus are injected direct into the circulation for every pound of live weight. This hog is then known as hyper-immune.

In the course of eight to ten days the hyper-immune is bled by the tail, taking as much blood as the hog will stand. As soon as the hog recovers from the effect of having a large quantity of blood removed from it, which is about a week, the hog is then bled again and this is continued until four bleedings have been made. Then the hog is re-hyperimmunized and bled four more times. This is continued until the tail becomes short, when the final bleeding is made by cutting the throat, and all of the blood is removed.

The blood from the tail and throat of the hyper-immunized hog is defibernated (the clot is removed) leaving the liquid portion of the blood which is the serum. To this serum is added enough carbolic acid to make one-half of a one per cent solution. The acid is added as a preservative. This serum is a preventive to hog cholera and cannot produce hog cholera because it contains the anti-bodies which are antagonistic to the germs of hog cholera.

There are thousands of dollars spent annually for so-called sure hog cholera "cures." Agricultural papers are full of very attractive advertisements of fake remedies. To spend money for such "fakes" is nothing less than throwing it away.

It would be well to bear in mind that all products advertised as "cures" for hog cholera are worthless; also that a large per cent of the serum and vaccines will not prevent hog cholera.

Anti-hog cholera serum, if properly prepared and administered, will, without a doubt, prevent hog cholera, but very little is claimed for it as a curative agent.

Virus

The virus used to hyper-immunize the immune hog is secured by injecting a small amount of virus (the liquid portion of the blood) from an acute case of hog cholera into a susceptible hog, or by exposing a susceptible hog to hog cholera infection. When the hog has developed an acute case of cholera, the hog is bled by the throat and the blood is then defibernated. The virus or liquid portion of the blood is injected direct into the circulation of the immune hog.

Ways of Vaccinating

There are two ways by which hogs may be vaccinated with anti-hog cholera serum, the Serum Alone Method and the Serum Simultaneous Method. The Serum Alone Method consists of injecting the required amount of serum into the tissues of the hogs with a hypodermic syringe.

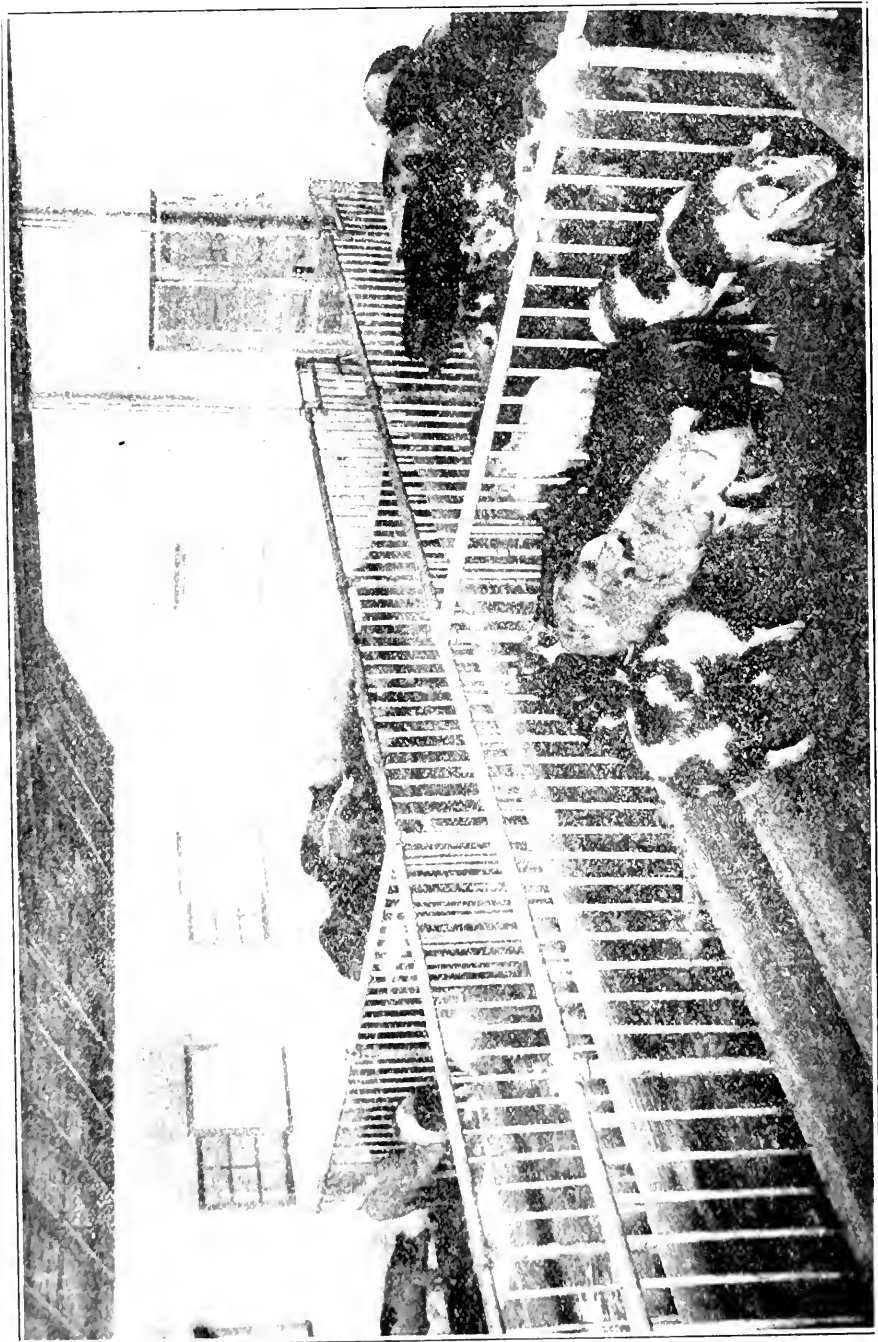


FIG. 9. Interior of virus hog house, showing virus hogs

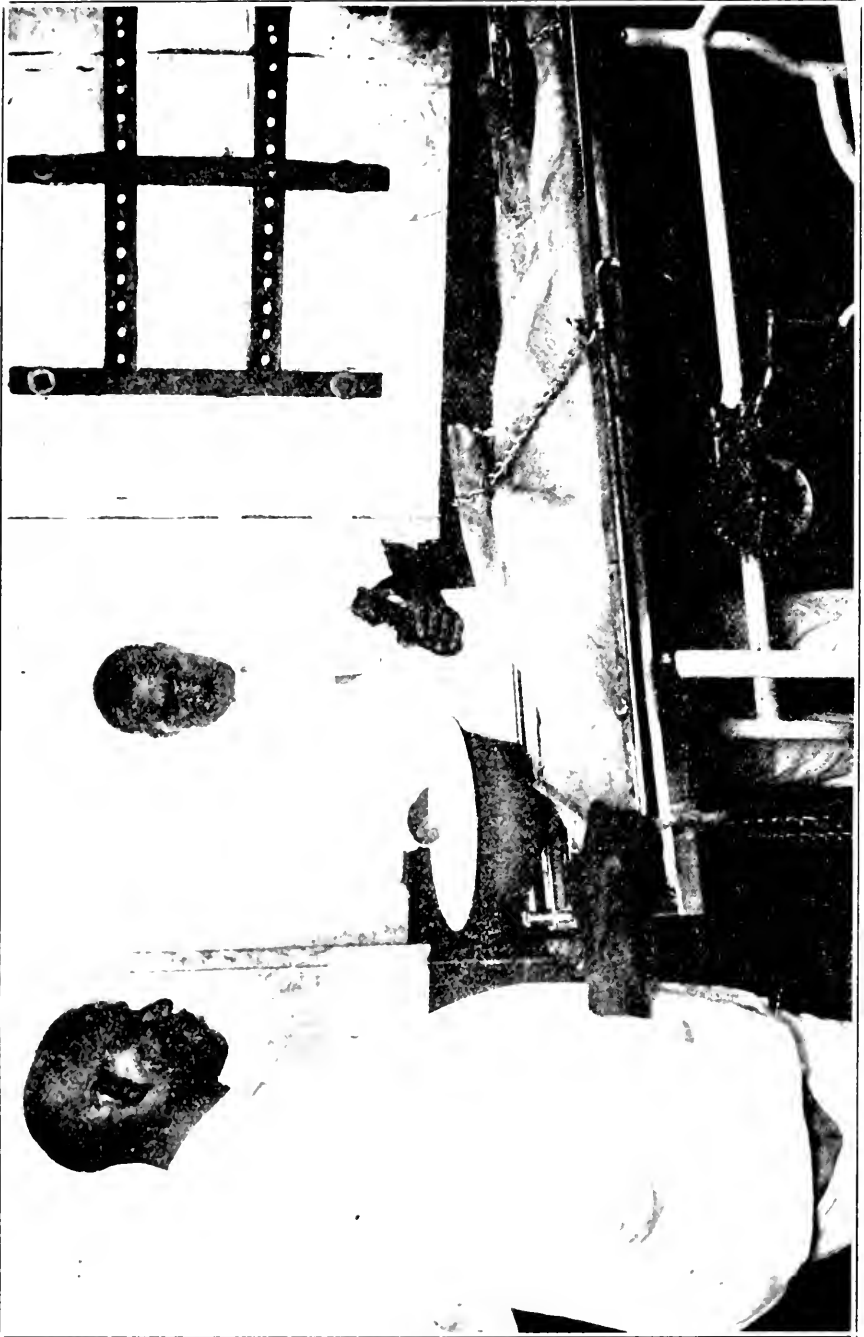


Fig. 10. Preparing "virus" hog for bleeding

The Serum Simultaneous Method consists of injecting the serum as in the Serum Alone Method, but at the same time a small amount of virus is injected.

The Serum Alone Method only confers immunity for a very short period, varying from four to eight weeks, whereas the Serum Simultaneous Method confers immunity, varying from a few months in very young pigs to life immunity in older hogs.

As there is considerable danger attached to the Serum Simultaneous Method, it is not safe to put this method of treatment into the hands of persons who have not had special training for this purpose. This is so because a small per cent of the hogs treated by this method develop hog cholera and die. This is so when the method is applied by men who have had long training and wide experience in using the serum and virus. We think it would be a great mistake to distribute the virus with the serum



FIG. 11. Injecting serum into armpit

over the State to any one applying for it. If this was done we would expect to see the entire State sooner or later "fired" with hog cholera. There is no danger of producing hog cholera by using the Serum Alone Method, and for this reason we think it is the only method to place in the hands of the untrained.

The serum is sent direct to any one ordering it, with full directions for using. If the directions are followed closely good results will follow. It is always better, whenever possible, to have some one inject the serum who has at least seen it injected, if they have not done so themselves. Our advice would be to employ a graduate veterinarian when possible and have him inject the serum for you.

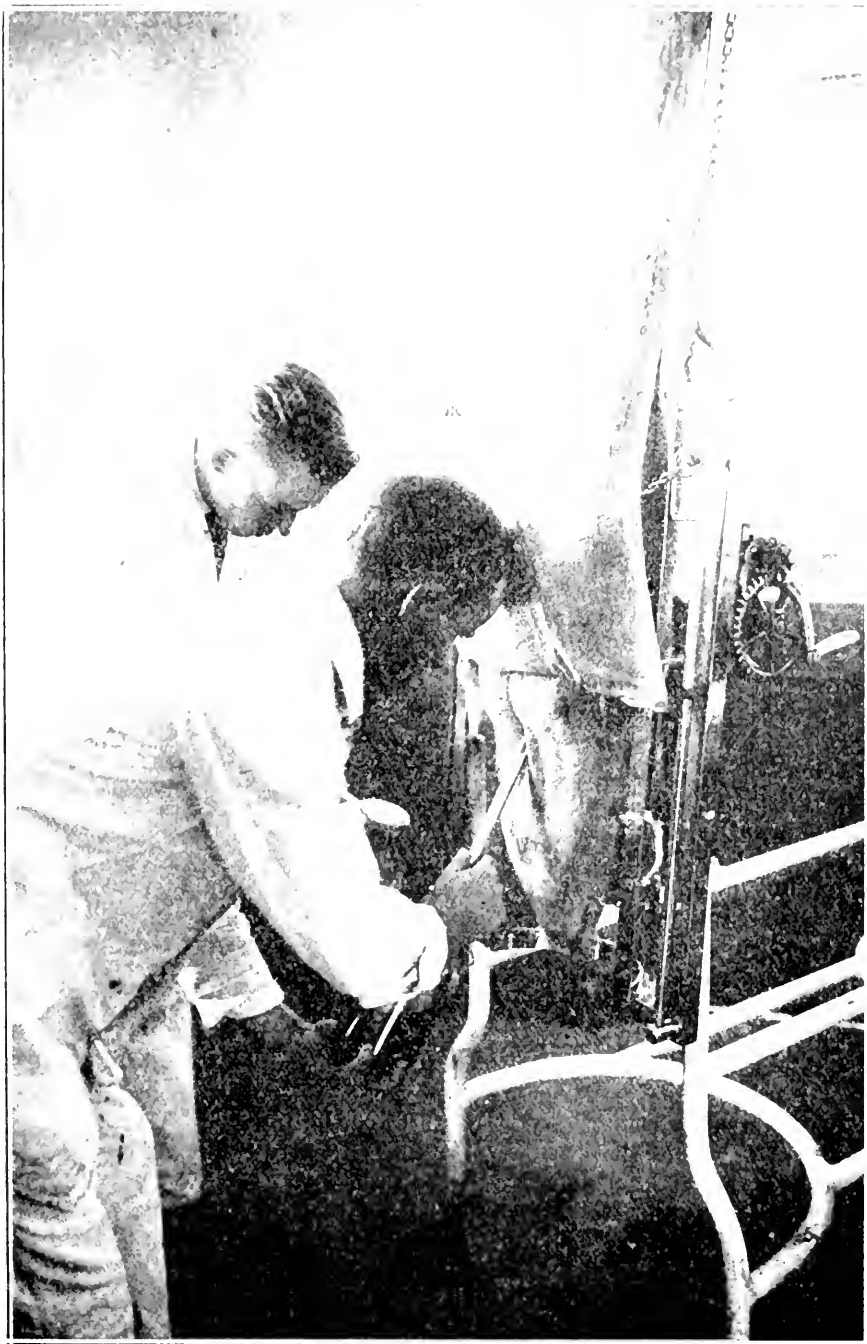


FIG. 12. Bleeding virus hog by throat

How and When to Use Serum

The Serum Alone Method only gives temporary immunity, lasting from four to eight weeks, an average of about six weeks. It is rather expensive to keep a herd of hogs immuned by this method. We believe it would be cheaper where a permanent herd is to be kept for breeding purposes to use the Simultaneous or Double treatment. This would insure protection at all times to the foundation of the herd.

The owner of a herd of hogs should not delay any longer than possible in securing the serum and injecting his hogs when it becomes known that they have been exposed to cholera, or when it is known that cholera is in his community, if there is any possibility of the infection gaining entrance to his herd through any of the many channels of entrance.

When the serum is used shortly before or very soon after the hogs are exposed to cholera infection the per cent protected is often as high as a hundred, but usually ranges around 95 per cent. After cholera has gained entrance in a herd and a portion of the hogs are showing physical or thermal symptoms of cholera, the per cent saved of the remaining apparently well hogs will not be so high, but a good per cent of those showing no physical or thermal symptoms will be protected.

When a large number of hogs in a herd become sick and begin to die it is pretty safe to say that they are affected with hog cholera. Immediate steps should be taken to secure the serum and inject the remaining well hogs.

To inject the serum one must have a hypodermic syringe (preferably a 20 or 30 cc. glass barreled one). This syringe should be sterilized by being boiled in water for fifteen or twenty minutes. Before using, the mouth of the serum bottle should be wiped off with a five per cent solution of carbolic acid and the serum then poured into the receptacle with a cover. Both the receptacle and cover should have been boiled in water for fifteen or twenty minutes and allowed to cool before pouring the serum into it. Keep the cover on all the time except when the serum is being poured into or taken from the receptacle. The hands of the person injecting the serum should be washed before beginning and kept clean all the time. Do not allow the syringe or needle to come in contact with soiled objects.

The serum is injected into the tissues either on the inside of the thigh or into the loose tissues between the foreleg and body. The needle is inserted perpendicularly to the depth of one-half or one inch, depending upon the size of the hog. The serum is then injected and the needle withdrawn. Before the needle is inserted the skin at the point selected should be washed with soap and water and then scrubbed with a reliable disinfectant, such as a five per cent solution of carbolic acid, lysol or eucolin.

Hogs in infected herds showing a temperature above 104 degrees F. are considered to be affected with cholera. The hogs showing high tempera-

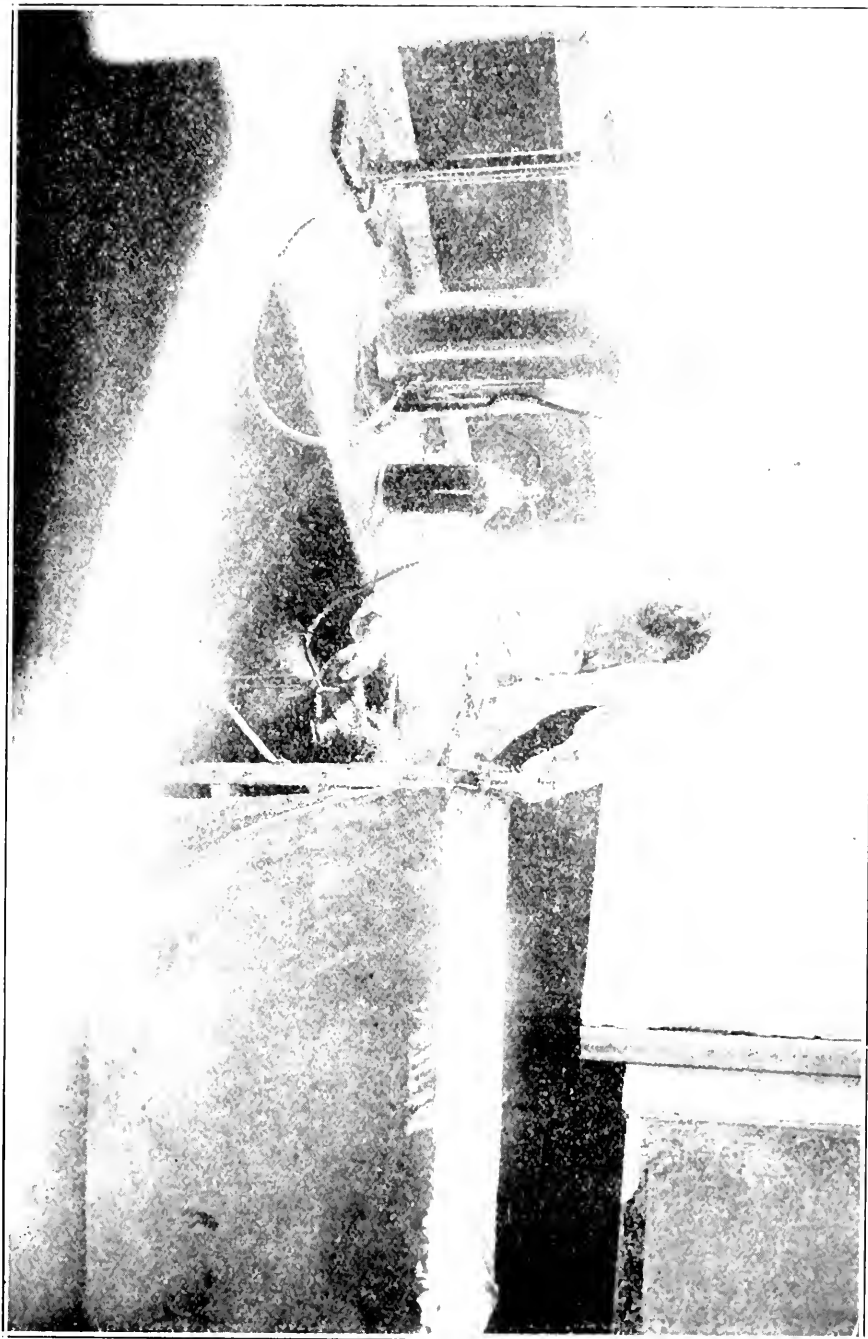


FIG. 13. Hyper-immunizing by injecting virus into ear vein of immune hog

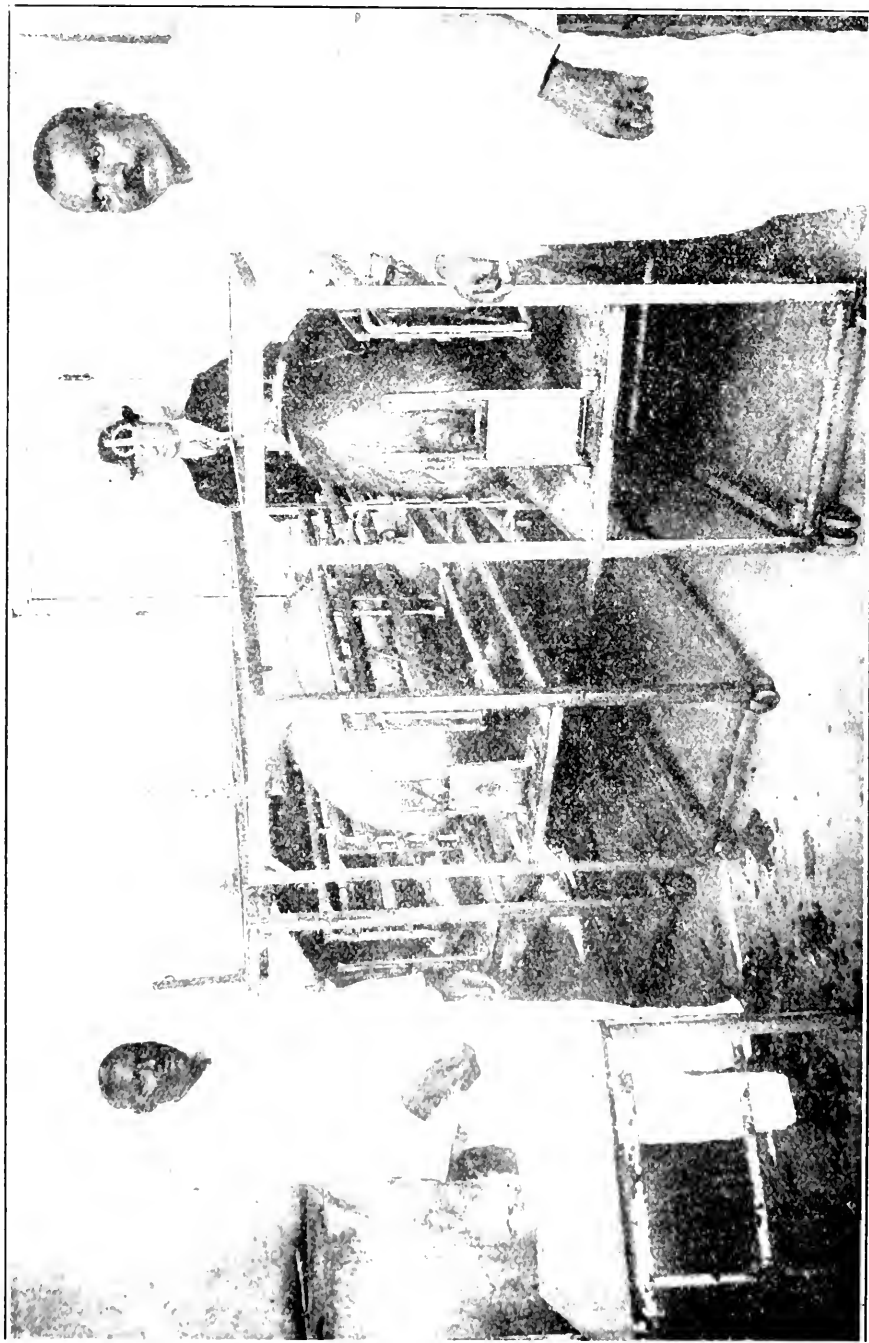


Fig. 14. Preparing hyper-immunes to be bled by tail

tures should be given a double dose of serum; apparently well hogs in infected herds should be given more serum than hogs in non-infected herds. (See dose table.)

The Serum as a Cure for Hog Cholera

No claim is made that the serum will "cure" a well developed case of hog cholera. A small per cent of the hogs showing a temperature above 104 degrees Fahrenheit will, if given a large dose of serum, make a recovery. We believe the per cent of recoveries will justify the expense of the serum used.

Vaccinating Infected Herds

Do not fail to take the temperature of all hogs in infected herds. Those showing a temperature of 104 degrees or higher should be given a double dose of serum.

Never use the Simultaneous treatment in infected herds (they already have enough infection). Hogs injected with a protective dose of serum and left in infected lots or pens for three weeks will, in all probability, contract enough infection to produce the same immunity as those treated with the Simultaneous method. However, one can never be sure of this.

The Dose of Serum

Care should be used in estimating the weight of every hog injected because the amount of serum to be used will depend on the weight of the hog and not on the age. Always be certain not to underestimate the weight; it is much better to overestimate than to underestimate. If the weight is underestimated and too small a dose of serum is given, the hog will not be protected from cholera. There is no danger in giving an overdose of serum; the larger the dose the more certain the protection.

Avoid turning the hogs into muddy, filthy or dusty lots after they are injected. It is better to keep them in a lot for several days until the puncture wound caused by the needle has had time to heal. If the wound becomes infected abscesses may follow. When abscesses form they should be opened and washed with an antiseptic solution.

A complete and accurate record should be kept by every farmer using the serum. He should record the number of hogs that have died from hog cholera at the time the serum is injected; also keep a record of the number of sick hogs in the infected lots; how many treated with serum; and the number of both treated and not treated that die. Don't fail to take the temperature of all hogs in an infected herd. Those that show a temperature of 104 degrees Fahrenheit are considered affected with hog cholera.

Tested Serum

All serum should be tested for potency before it is used in the field. Serum sent out by this Department is tested in the following manner:



FIG. 15. Bleeding hyper-immunes by tail

The bleedings from the tail and the final bleeding by the throat of a number of hyperimmune hogs are thoroughly mixed, which is then tested on susceptible pigs. The test is made by injecting two cubic centimeters of virus into each of four susceptible pigs (25 to 35 pounds) preferably from the same litter. These pigs are then injected with different amounts of serum. No. 1 would get two cubic centimeters of virus and twenty cubic centimeters of serum; No. 2, fifteen cubic centimeters of serum and two cubic centimeters of virus; No. 3, ten cubic centimeters of serum and two cubic centimeters of virus; No. 4 would get two cubic centimeters of virus and no serum. If No. 4 dies within fifteen days and Nos. 1, 2, and 3 show no signs of sickness, we then know that the virus used was virulent and that the serum protected Nos. 1, 2, and 3 from what would have been a fatal dose of virus.

Directions for Ordering Serum

The serum will be shipped, by express, C. O. D., to any one ordering it, unless check or money order accompanies the order. Do not fail to give correct address.

Always state correctly the amount of serum wanted, or give the weight of each hog to be treated. If a hypodermic syringe is desired, state so in your order, otherwise it will not be sent. A thirty cubic centimeter glass barreled syringe will be sent at cost, if ordered.

The serum will be shipped in the following size bottles:

30 c.c., 50 c.c., 150 c.c., 250 c.c., 500 c.c., and 1000 c.c.

The cost of the serum is three-fourths of a cent per cubic centimeter. NO SERUM WILL BE TAKEN BACK; WHEN THE SERUM IS PLACED IN THE EXPRESS OFFICE IT BECOMES YOUR SERUM.

Address all communications for serum to the State Veterinarian, Department of Agriculture, Raleigh, N. C.

Vaccination Doses

It requires more serum per pound of weight to "immunize" young pigs than is required to "immunize" older hogs.

	Cholera-free Herds for Serum Alone Method	Cholera-infected Herd for Simulta- neous Method
Suckling pigs	5 to 20 c.c.	10 to 25 c.c.
25 to 50 pounds.....	25 c.c.	30 c.c.
50 to 100 pounds.....	40 c.c.	50 c.c.
100 to 150 pounds.....	50 c.c.	60 c.c.
150 to 200 pounds.....	60 c.c.	70 c.c.
200 to 250 pounds.....	70 c.c.	80 c.c.
250 to 300 pounds.....	80 c.c.	90 c.c.
300 to 350 pounds.....	90 c.c.	100 c.c.
All over 350 pounds	100 c.c.	120 c.c.

The North Carolina Department of Agriculture assumes no responsibility.

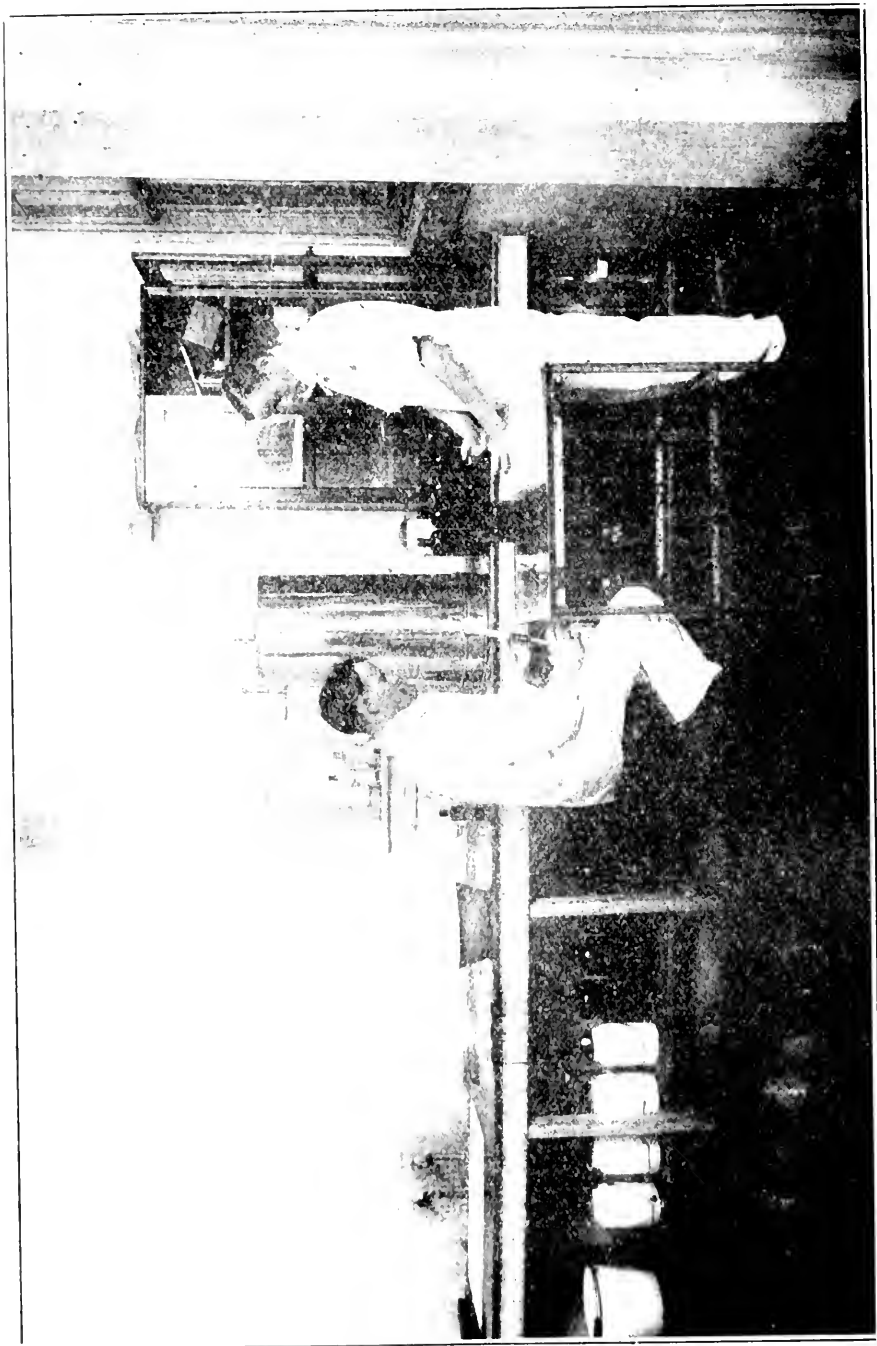


FIG. 16. Bottling serum

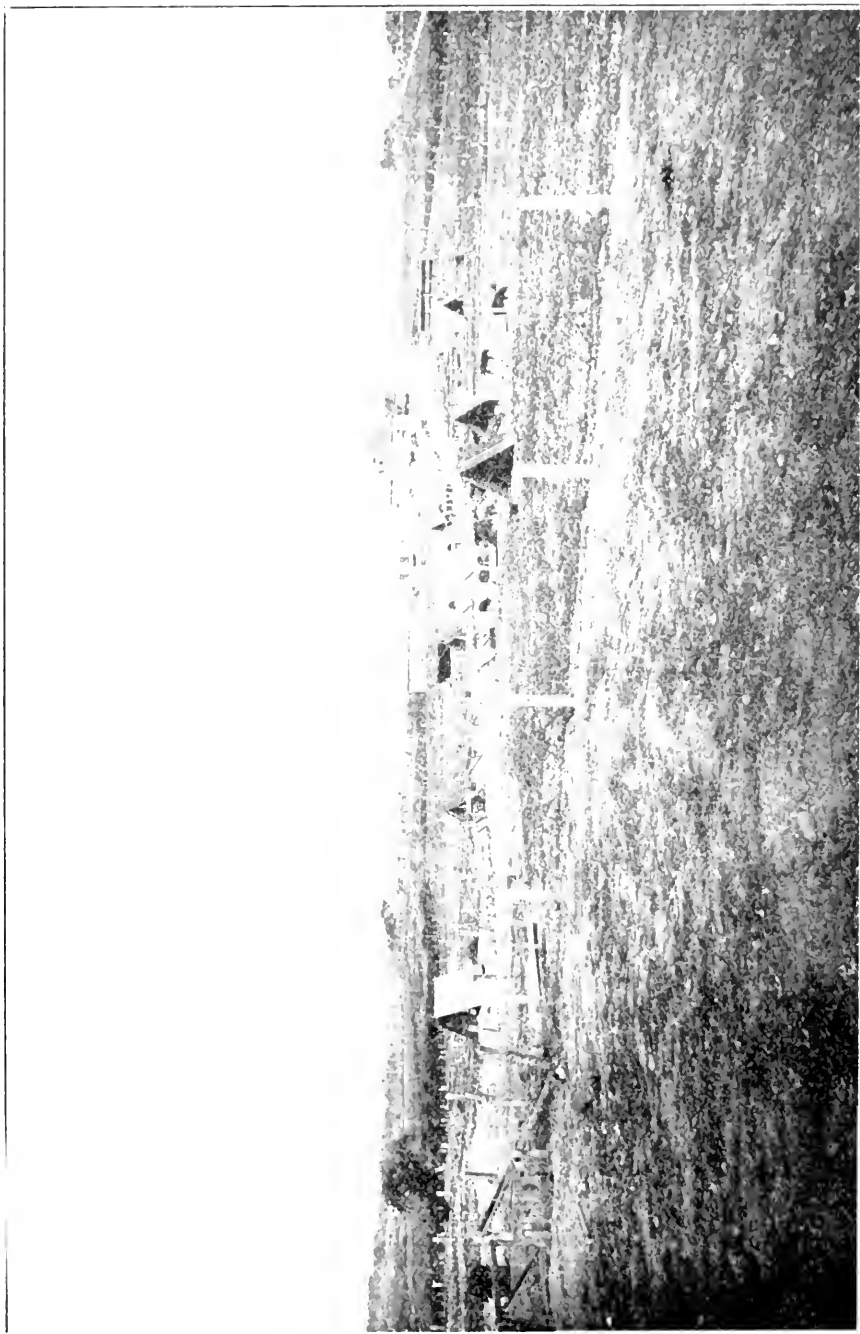


FIG. 17. View of serum plant and hog lots

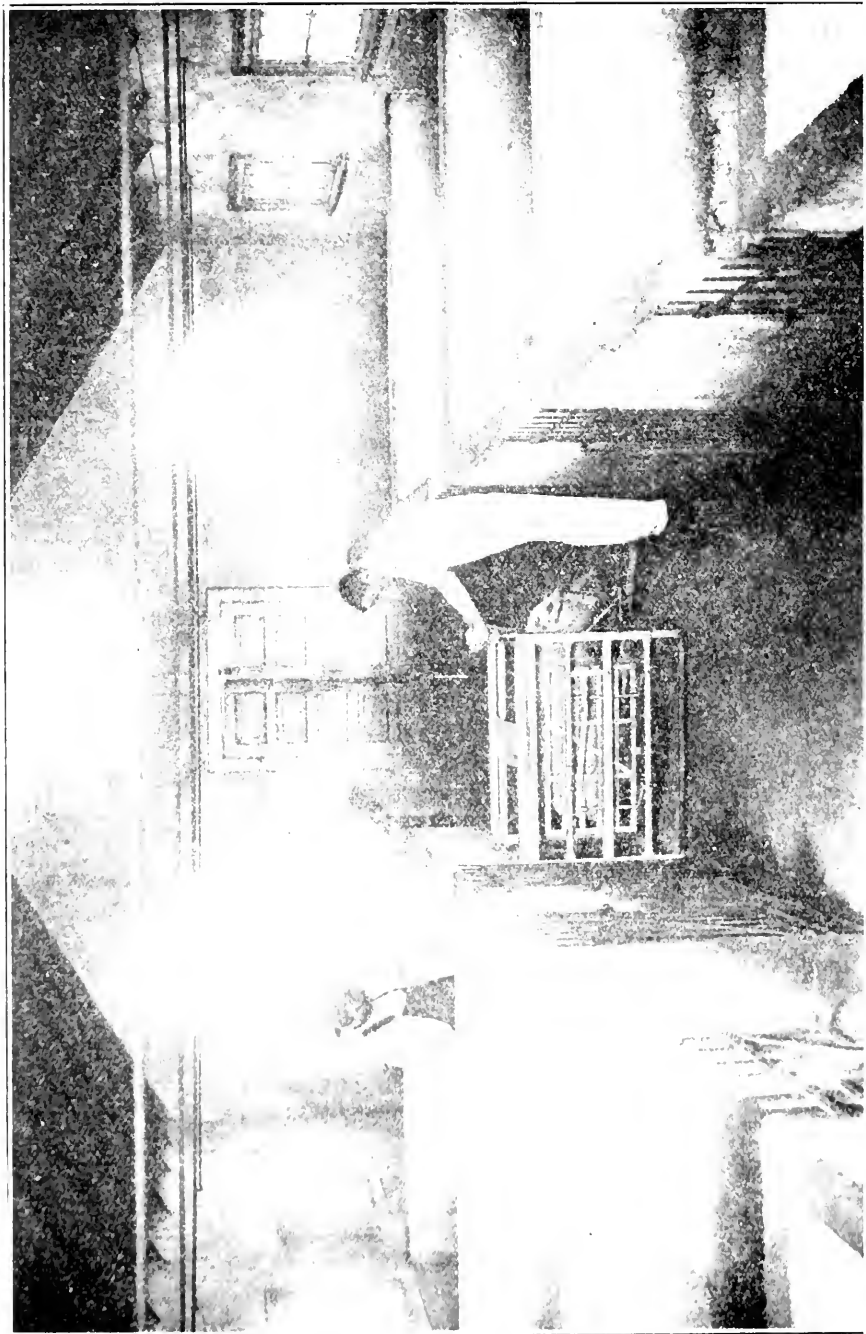


FIG. 18. Interior hyper-immune hog house

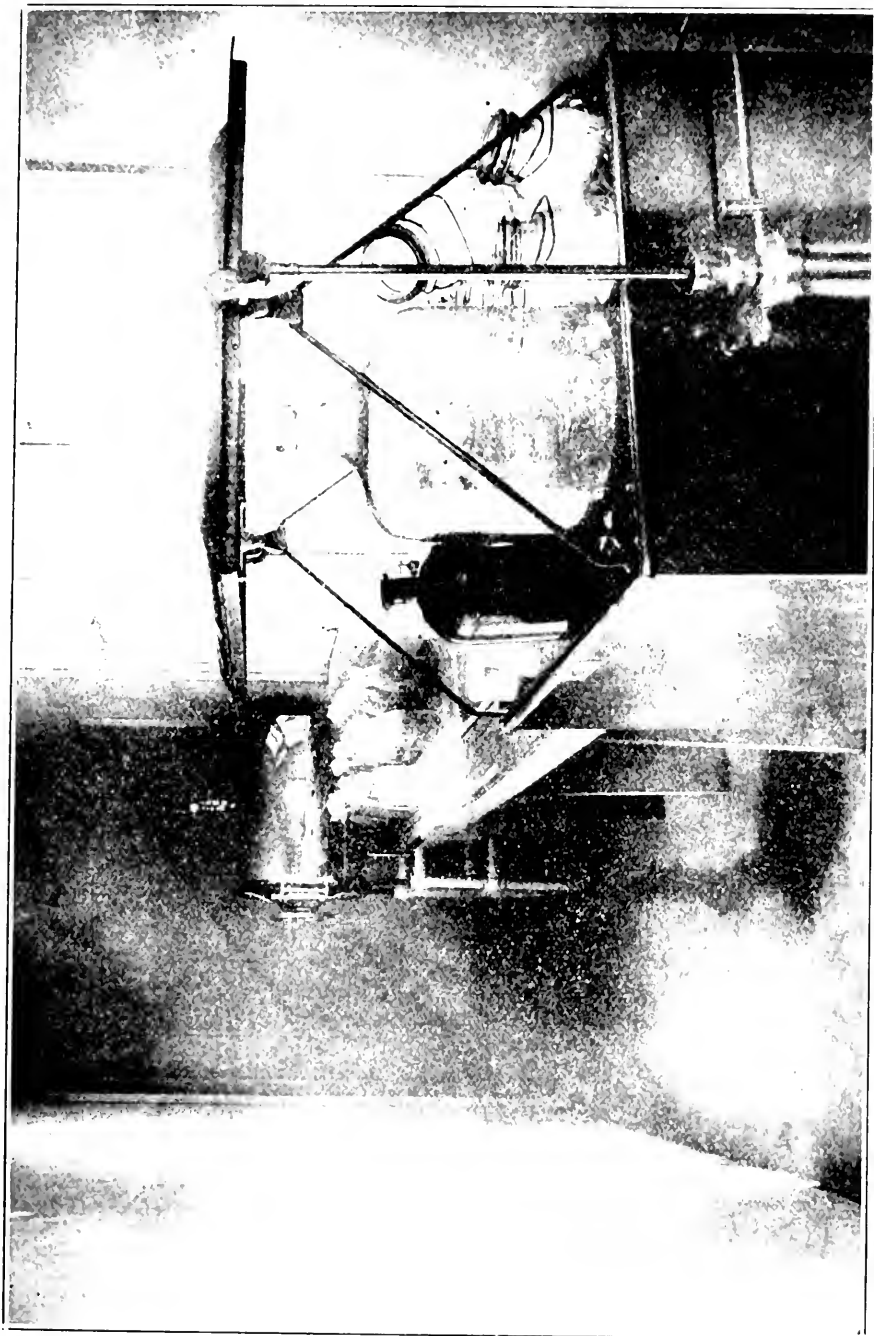


FIG. 19. Sterilizing room

LAWS TO PREVENT THE SPREAD OF HOG CHOLERA

Penalty for Allowing Diseased Hogs to Run at Large

"If any person having swine affected with the disease known as hog cholera, or any other infectious or contagious disease, and discovering the same, or to whom notice of the fact shall be given, shall fail of neglect for five days to secure the diseased swine from the approach or contact with other hogs not so affected, by penning or otherwise securing and effectually isolating them, so that they shall not have access to any ditch, canal, branch, creek, river, or other watercourse which passes beyond the premises of the owners of such swine, he shall be guilty of a misdemeanor, and upon conviction shall be fined not exceeding fifty dollars or imprisoned not exceeding thirty days."—*Section 3297 of the Revisal of 1905 of North Carolina; 1889, ch. 173, sec. 1; 1891, ch. 67, secs. 1, 3; 1903, ch. 106; 1899, ch. 47.*

Penalty for Failure to Properly Dispose of Carcasses of Animals Dying From Infectious Diseases

"If any hog or other animal shall die with the hog cholera or other infectious disease, and the owner thereof shall fail to burn or to so bury the same as to secure it from the reach or contact with other hogs or other domestic animals of value, or if he shall throw or place such hog or other animal in any ditch, canal, branch, creek, river, or other watercourses passing beyond his own premises, he shall be guilty of a misdemeanor and upon conviction shall be fined not more than fifty dollars or imprisoned not more than thirty days."—*Section 3298 of the Revisal of 1905 of North Carolina; 1889, ch. 173, sec. 2; 1891, ch. 67, secs. 2, 3; 1903, ch. 106; 1899, ch. 47.*

AN ACT TO PREVENT THE SPREAD OF HOG CHOLERA.

SECTION 1. That it shall be the duty of every person, firm or corporation who shall lose a hog by any form of natural death to have the same buried in the earth to a depth of at least two feet within twelve hours after the death of the animal.

SEC. 2. That any person, firm or corporation that shall fail to comply with the terms of this act shall be guilty of a misdemeanor and shall be fined not less than five dollars nor more than ten dollars for each offense, at the discretion of the court.

SEC. 3. That this act shall be in force on and after the first day of May, 1915.

LEAF TOBACCO REPORT FOR JANUARY, 1916.

Pounds sold for producer.....	23,225,595
Pounds sold for dealers.....	1,358,554
Pounds sold for warehouses.....	1,831,873
Total	<u>26,416,022</u>

THE BULLETIN
OF THE
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE
RALEIGH

Vol. 37, No. 4

APRIL, 1916

Whole No. 219



REPORT ON VARIETY TESTS OF CORN FOR 1915

PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Postoffice at Raleigh, N. C., as second class matter,
February 7, 1901, under Act of June 6, 1900.

EDWARDS & BROUGHTON PRINTING CO.
STATE PRINTERS

STATE BOARD OF AGRICULTURE

W. A. GRAHAM, Commissioner, *ex officio* Chairman, Raleigh.

F. P. LATHAM.....	Belhaven.....	First District.
C. W. MITCHELL.....	Aulauder.....	Second District.
R. L. WOODARD.....	Pamlico.....	Third District.
CLARENCE POE.....	Raleigh.....	Fourth District.
R. W. SCOTT.....	Haw River.....	Fifth District.
A. T. McCALLUM.....	Red Springs.....	Sixth District.
C. C. WRIGHT.....	Hunting Creek.....	Seventh District.
WILLIAM BLEDSOE.....	Gale.....	Eighth District.
W. J. SHUFORD.....	Hickory.....	Ninth District.
A. CANNON.....	Horse Shoe.....	Tenth District.

OFFICERS AND STAFF

W. A. GRAHAM.....	Commissioner.
K. W. BARNES.....	Secretary and Purchasing Agent.
MISS SARAH D. JONES.....	Bookkeeper.
D. G. CONN.....	Bulletin Superintendent.
B. W. KILGORE.....	State Chemist, Director Test Farms.
J. M. PICKEL.....	Feed Chemist.
W. G. HAYWOOD.....	Fertilizer Chemist.
J. Q. JACKSON.....	Assistant Chemist.
E. S. DEWAR.....	Assistant Chemist.
E. B. HART.....	Assistant Chemist.
D. M. McCarty.....	Assistant Chemist.
F. C. WIGGINS.....	Assistant Chemist.
J. F. HATCH.....	Fertilizer Clerk.
R. W. COLLETT.....	Assistant Director Test Farms.
H. H. BRIMLEY.....	Curator of Museum.
T. W. ADICKES.....	Assistant Curator.
FRANKLIN SHERMAN, Jr.....	Entomologist.
R. W. LEBBY.....	Assistant Entomologist.
S. C. CLAPP.....	Assistant Entomologist in Field Work.
B. B. FLOWE.....	Veterinarian.
H. P. FLOWE.....	Assistant Veterinarian.
E. G. HARGETT.....	Assistant Veterinarian.
W. N. HUTT.....	Horticulturist.
R. G. HILL.....	Assistant Horticulturist.
C. D. MATTHEWS.....	Assistant Horticulturist.
T. B. PARKER.....	Director of Farmers' Institutes.
W. M. ALLEN.....	Chemist and Chief, Division Food and Oil Inspection.
E. W. THORNTON.....	Assistant Chemist, Division Food and Oil Inspection.
C. E. BELL.....	Assistant Chemist, Division Food and Oil Inspection.
LELAND B. RHODES.....	Assistant Chemist, Division Food and Oil Inspection.
C. B. WILLIAMS.....	Chief, Division of Agronomy.
J. K. PLUMMER.....	Soil Chemist.
W. F. PATE.....	Agronomist in Soils.
R. Y. WINTERS.....	Plant Breeding.
*W. E. HEARN.....	State Soil Agent, Soil Survey.
L. L. BRINKLEY.....	Soil Survey.
H. D. LAMBERT.....	Soil Survey.
S. O. PERKINS.....	Soil Survey.
J. L. BURGESS.....	Agronomist and Botanist.
C. H. WALDRON.....	Assistant Agronomist and Botanist.
MISS LOUISE A. RADEMACHER.....	Assistant to Botanist.
MISS ALMA I. STONE.....	Assistant to Botanist.
DAN T. GRAY.....	Chief in Animal Industry.
R. S. CURTIS.....	Associate in Animal Industry.
W. H. EATON.....	Dairy Experimenter.
ALVIN J. REED.....	Dairy Farming.
STANLEY COMBES.....	Assistant in Dairy Farming.
†J. A. AREY.....	Assistant in Dairy Farming.
F. R. FARNHAM.....	Assistant in Dairy Farming.
F. T. PEDEN.....	Beef Cattle.
EARL HOSTETLER.....	Assistant in Beef Cattle and Swine.
†A. L. JERDAN.....	Beef Cattle.
†L. E. CASE.....	Assistant in Beef Cattle.
†B. P. FOLK.....	Pig Clubs.
†A. G. OLIVER.....	Poultry Clubs.
†E. H. MATHEWSON.....	Tobacco Investigations.
†C. R. HUDSON.....	Farm Demonstration Work.
†T. E. BROWNE.....	Assistant in Charge of Boys' Clubs.
†A. K. ROBERTSON.....	Assistant in Boys' Clubs.
†MRS. JANE S. MCKIMMON.....	Assistant in Charge Girls' Clubs.
MISS M. L. JAMISON.....	Assistant in Home Economics.

C. E. CLARK, Assistant Director Edgecombe Test Farm, Rocky Mount, N. C.

F. T. MEACHAM, Assistant Director Iredell Test Farm, Statesville, N. C.

JOHN H. JEFFERIES, Assistant Director Pender Test Farm, Willard, N. C.

S. F. DAVIDSON, Assistant Director Buncombe Test Farm, Swannanoa, N. C.

E. G. MOSS, Assistant Director Granville Test Farm, Oxford, N. C.

J. E. DAVIDSON, Assistant Director Transylvania Test Farm, Blantyre, N. C.

*Assigned by the Bureau of Soils, United States Department of Agriculture.

†Assigned by the Bureau of Animal Husbandry, United States Department of Agriculture.

‡In cooperation with Bureau of Plant Industry, United States Department of Agriculture.

LETTER OF TRANSMITTAL

RALEIGH, N. C., March 16, 1916.

HON. W. A. GRAHAM,

Commissioner of Agriculture.

SIR:—I submit herewith the results of field trials with different varieties of corn secured during the past year by the Division of Agronomy on different types of soil in different parts of the State. I would recommend that these be published as April BULLETIN of the Department.

Yours respectfully,

C. B. WILLIAMS,

Chief, Division of Agronomy.

Approved for publication:

W. A. GRAHAM,

Commissioner.

CORN VARIETY TESTS FOR 1915.

BY R. Y. WINTERS, G. M. GARREN, AND BENTON WHITE.

OUR CORN CROP.

The 1915 corn crop of the State is estimated at 61,050,000 bushels, an average yield of 21 bushels per acre. Compared with the estimated yield for 1913 this shows an increase of 1.5 bushels per acre. This amount seems small when the increase for one acre is considered; but it amounts to an increase of 4,500,000 bushels in the corn crop of the State. The average corn yield for the State is less by 7.2 bushels per acre than that of the entire country. When one compares the present average yield for the State with yields from individual farms or even the average for the country it indicates our future possibilities.

Most of our increase in corn yield has come from the use of better methods of culture, rotations, and the more intelligent use of fertilizers. Our energies have been used to make the soil a better place for growing corn. More recently we have learned to improve the seeds so that they will produce better crops on these soils. Some varieties are better producers than others and certain plants of each variety are better producers than others. With this in mind, one should secure the best variety and save seed from its best plants. It is the object of this BULLETIN to suggest a few of the best corn varieties for the different sections of the State.

THE CORN VARIETY TESTS.

Twenty-four of corn varieties were grown for comparison at six of the State Test Farms. With the exception of two extra varieties at the Iredell Farm, the same varieties were grown at each of the farms. The varieties were planted in duplicate series which together made one-twentieth of an acre. The rows were made four feet apart and the seed were dropped by hand at intervals of two feet. The plants were thinned to one stalk per hill.

THE VARIETIES.

Among the varieties tested are two strains of yellow corn and twenty-two of white. One of the yellow corns, Jarvis' Golden, is a two-eared corn, and the other, Wyatt's Improved Yellow, is a one-eared corn. The twenty-two white corns include a few large one-eared varieties, several medium to large two-eared varieties and several of the smaller prolific varieties. The varieties are listed in Table I, according to the average number of ears per stalk. The values for average number and weight of ears per stalk is an average of results from five of the test farms.

TABLE I.—AVERAGE NUMBER AND WEIGHT OF EARS PER STALK.

Varieties	Average Number of Ears Per Stalk	Average Weight, in Pounds, of Ears Per Stalk
Biggs' Seven Ear.....	1.72	.60
Batts' Four Ear.....	1.49	.60
Gerrick's Prolific.....	1.40	.58
Weekley's Improved.....	1.38	.62
Cocke's Prolific.....	1.29	.58
Southern Beauty.....	1.29	.61
Wannamaker.....	1.29	.61
Jarvis' Golden Prolific.....	1.27	.59
Marlboro Prolific.....	1.23	.58
Goodman's Prolific.....	1.22	.52
Lippard's Improved.....	1.22	.57
Blount's Prolific.....	1.22	.49
Parker's Prolific.....	1.20	.58
Latham's Double.....	1.19	.60
Coker's Williamson.....	1.11	.59
Eureka.....	1.05	.55
First Generation Cross No. 182.....	1.03	.58
Deaton's Favorite.....	1.02	.58
Hickory King.....	1.01	.45
Southern Snow Flake.....	1.00	.54
Boone County White.....	.99	.52
Shenandoah White Dent.....	.98	.51
Wyatt's Improved Yellow.....	.97	.55
Columbia Beauty.....	.96	.51

THE BUNCOMBE TEST FARM.

The Buncombe Test Farm is located in the Swannanoa Valley about eleven miles east of Asheville. The farm is about 2,400 feet above sea level. According to the U. S. Weather Bureau report* on this section the average date for the last killing frost in spring is April 17, and the average date for the first killing frost in fall is October 3. This gives an average of 169 days between the spring and fall frosts. During the past season the rainfall for this section was 40.22 inches, 9.34 less than normal. Fifty per cent of the total rainfall was well distributed throughout the corn growing season. The soil of this farm on which the tests were made is classified as Porter's Loam.

The varieties and results of this test are listed in Table II, according to yield of shelled corn per acre.

In this test the varieties range in yield between 28.2 and 50.6 bushels of shelled corn per acre, with a difference of 22.4 bushels between the lowest and highest yielding variety. The two highest yielding varieties, Latham's Double and Southern Beauty, were rather low yielders at this farm in 1914.

*U. S. Weather Bureau, Climatological Data, N. C. Section, 1915.

TABLE II.—VARIETY TEST OF CORN AT THE BUNCOMBE TEST FARM, 1915

Rank According to Yield Per Acre in Bushels of Shelled Corn	Varieties	Number of Stalks Per Plot by Actual Count			Average Height in Inches at Maturity			Number of Ears			Yield Per Plot and Related Data			Shelling Capacity			Yield Per Acre					
		Stalks	Ears	Per Plot	Average Per Stalk	No Ears	One Ear	Two Ears	Three or More Ears	Pounds of Stover	Pounds of Ears	Per Cent Stover	Per Cent Ears	Pounds of Bushels to Shell One Bushel of Shelled Corn	Weight of Cobs from Bushel of Corn	Per Cent Grain	Per Cent Cob	Pounds Stover	Pounds Ears	Bushels of Shelled Corn		
1	Latham's Double.....	241	113.4	53.3	320	1.33	6	150	58	0	112.0	169.5	45.55	54.44	67.0	54.0	13.0	80.60	19.40	2840	3390	50.9
2	Southern Beauty.....	235	104.8	47.5	345	1.34	2	151	78	0	89.0	151.5	37.01	62.99	64.0	53.0	11.0	82.81	17.19	1780	3070	47.4
3	Denton's Favorite.....	233	113.5	48.3	241	1.03	11	203	19	0	126.0	143.0	46.84	53.16	66.0	53.0	13.0	80.30	19.70	2520	2860	43.4
4	Lippard's Improved.....	231	105.2	47.8	304	1.30	6	148	76	0	101.0	139.0	42.08	57.92	67.0	55.0	12.0	82.09	17.91	2920	2780	41.4
5	Coke's Prolific.....	244	116.0	52.8	350	1.43	3	132	109	0	89.0	144.5	38.42	61.58	73.0	58.0	15.0	79.45	20.55	1780	2890	39.6
6	Weekley's Improved.....	246	104.4	45.4	342	1.32	3	144	99	0	95.0	138.0	40.77	59.23	72.0	56.0	16.0	77.78	22.22	1900	2760	38.4
7	First Generation Cross No. 12.....	247	103.7	40.7	233	1.07	7	187	23	0	75.0	136.5	35.46	64.54	71.0	56.0	15.0	78.87	21.13	1500	2730	38.4
8	Parker's Prolific.....	236	98.4	42.4	308	1.31	7	150	79	0	76.0	136.0	35.85	64.15	73.0	57.0	15.0	79.47	20.53	1520	2720	37.8
9	Bates' Four Ear.....	248	109.8	47.4	388	1.56	4	106	63	5	104.0	131.0	43.70	56.30	72.0	57.0	16.0	78.08	21.92	2080	2680	36.8
10	Wyatt's Improved Yellow.....	223	100.0	42.7	224	1.00	6	210	7	0	82.0	130.0	38.68	61.32	70.0	55.0	15.0	78.37	21.63	1640	2600	36.8
11	Wannamaker.....	220	114.8	51.5	365	1.39	5	128	84	3	125.0	128.0	49.00	51.00	72.0	56.0	16.0	77.78	22.22	2460	2560	35.6
12	Goodman's Prolific.....	237	111.3	48.7	336	1.41	6	128	101	2	79.0	123.0	39.41	60.59	69.0	57.0	12.0	82.61	17.39	1580	2460	35.6
13	Gerrick's Prolific.....	249	113.0	56.4	359	1.44	7	126	115	1	112.5	126.0	53.07	46.93	68.0	53.0	15.0	74.65	25.35	2830	2520	35.4
14	Columbia Beauty.....	214	102.6	42.0	210	.95	16	186	42	0	76.0	147.0	39.38	60.62	67.0	55.0	12.0	82.09	17.91	1520	2440	35.0
15	Coker's Williamson.....	237	110.8	57.4	280	1.18	9	176	52	0	131.0	121.0	51.98	48.02	70.0	54.0	16.0	77.41	22.59	2620	2420	34.6
16	Marlboro Prolific.....	240	108.7	50.4	297	1.25	12	164	65	2	99.0	123.5	44.41	55.51	72.0	57.0	15.0	79.47	20.53	1980	2470	34.4
17	Jarvis' Golden Prolific.....	237	100.7	39.8	300	1.27	14	153	72	1	80.0	149.0	40.24	59.76	69.0	56.5	12.5	81.88	18.12	1600	2380	34.4
18	Blond's Prolific.....	244	109.5	47.7	317	1.32	7	152	84	1	83.0	121.5	40.59	59.41	71.0	60.0	14.0	81.08	19.92	1660	2430	32.8
19	Biggs' Seven Ear.....	234	105.8	46.2	393	1.68	7	82	114	26	77.0	114.0	40.31	59.69	71.0	58.0	13.0	81.69	18.31	1540	2280	32.2
20	Hickory King.....	222	105.0	38.7	230	1.04	9	196	47	0	82.0	107.0	43.39	56.61	66.5	55.0	11.5	82.71	17.29	1640	2440	32.2
21	Southern Snow Flake.....	214	99.4	37.7	297	.98	9	197	5	0	67.4	106.0	38.73	61.27	67.0	53.0	14.0	79.10	20.90	1340	2420	31.6
22	Boone County White.....	213	96.1	39.4	241	1.02	5	198	10	0	69.4	107.0	36.81	63.19	66.0	53.0	13.0	80.30	19.70	1200	2060	31.2
23	Shenandoah White Dent.....	247	102.2	37.2	299	.96	14	197	6	0	55.6	103.0	34.81	65.19	69.0	56.0	13.0	81.46	18.54	1400	2060	29.8
24	Eureka.....	237	145.0	53.1	234	.97	24	195	18	0	403.0	101.5	50.37	49.63	72.0	55.0	17.0	76.39	23.61	2060	2030	28.2

TABLE III.—COMPILED RESULTS OF VARIETY TEST OF CORN—BUNCOMBE TEST FARM.

Rank According to Yield Per Acre in Bushels of Shelled Corn	Varieties	Yield Per Acre										Average for Five Years	
		1910		1912		1913		1914		1915			
		Pounds of Stover	Bushels of Shelled Corn	Pounds of Stover	Bushels of Shelled Corn	Pounds of Stover	Bushels of Shelled Corn	Pounds of Stover	Bushels of Shelled Corn	Pounds of Stover	Bushels of Shelled Corn		
1	Boone County White	1470	37.2	2736	33.4	999	23.4	1250	35.5	1200	31.2	1531	32.1
2	Weekley's Improved	1720	36.6	2808	35.9	1323	19.4	2579	28.5	1909	38.4	2065	31.8
3	Southern Beauty	1580	42.3	2430	28.5	1053	19.5	1725	20.3	1780	47.4	1711	31.6
4	Biggs' Seven Ear	1630	37.5	2628	37.0	1134	20.2	2075	28.2	1540	32.2	1801	31.0
5	Bart's Four Ear	1680	35.2	1728	38.4	1131	21.3	2050	29.6	2080	36.8	1794	30.5
6	Parker's Prolific	1570	34.8	2898	32.1	1107	17.2	1900	29.4	1520	37.8	1799	30.3
7	Goodman's Prolific	1760	31.6	2538	28.8	1212	18.1	2150	33.4	1580	35.6	1851	30.1
8	Bloont's Prolific	1170	29.1	2646	33.4	1080	19.3	1200	33.5	1660	32.8	1611	29.6
9	Hickory King	1170	38.3	2160	32.8	1188	18.8	1450	26.0	1610	32.2	1582	29.6
10	Shenandoah White Dent	1380	37.3	2016	31.3	918	21.0	1825	27.0	1100	29.8	1148	29.3
10	Southern Snow Flake	1740	33.9	2052	28.5	1296	20.4	2250	28.1	1340	31.6	1736	28.5
10	Columbia Beauty	1330	34.6	2376	27.5	1134	20.6	1675	24.6	1520	35.0	1607	28.5

*1910 results used in place of 1911, as there was no variety test at the Buncombe Farm that year.

In the comparison of varieties it is difficult to secure uniform conditions for all varieties during an individual test. For this reason results from a series of tests should furnish a more reliable comparison. Table III contains compiled results of twelve varieties which have been tested at the Buncombe Farm during the same five years. The varieties are arranged in order of yield of shelled corn per acre. The average yields range between 28.5 and 32.1 bushels per acre, a difference of 3.6 bushels between the lowest and highest yielding variety. The difference between the highest and lowest is rather small here, and the differences in the first three or four varieties is too small to be considered of much importance.

THE IREDELL TEST FARM.

The Iredeell Test Farm is located in the western portion of the Piedmont section, about two miles northwest of Statesville. This section had unusually good conditions for corn growing during the past season. The rainfall amounted to 59.4, 8.63 inches above normal. About fifty-five per cent of the rainfall came during the growing season. The corn varieties were planted in a uniform field of Cecil Clay Loam.

The varieties and results of this test are listed in Table IV, according to yield of shelled corn per acre.

At the Iredeell farm the varieties ranged in yield between 42.6 and 60.8 bushels per acre, a difference of 18.2 bushels between the lowest and highest yielding variety. At 75 cents per bushel this gives a difference in money value of \$13.65 per acre between the lowest and highest yielding variety. The two leading varieties of this test, Jarvis' Golden Prolife and Southern Beauty, are being bred in the State. Both of these varieties have been good yielders in previous tests at this farm.

Since twelve of the corn varieties have been tested at the Iredeell farm during the same five years a comparison of their average yields should be of value here. Table V contains a list of these varieties arranged in order of their average yields. The average yields range between 33.3 and 45.7 bushels per acre, with a difference of 12.4 bushels between the lowest and highest yielding variety. In this series of tests the more prolific varieties are the highest yielders. The two varieties which lead in this series of tests do not lead in the production of ears per stalk. Southern Beauty and Weekley's Improved rarely produce more than two ears per stalk. Such results suggest that it would be best to select corn in this section for two medium-sized ears rather than for the larger number of small ears. This matter is discussed more fully in another portion of this BULLETIN.

THE CENTRAL FARM.

The Central Farm is located in the eastern portion of the Piedmont section, about two miles west of Raleigh. The past season in this section has been unusually dry for the best growth of corn. The total

TABLE IV.—VARIETY TEST OF CORN AT THE IRIDELL TEST FARM, 1915.

Rank According to Yield Per Acre in Bushels of Shelled Corn	Varieties	Average Height in Inches at Maturity		Number of Ears	Number of Stalks Bearing—			Yield Per Plat and Related Data				Shelling Capacity				Yield Per Acre							
		Stalks	Ears		Per Plat	Average Per Stalk	No Ears	One Ear	Two Ears	Three or More Ears	Pounds of Stover	Pounds of Ears	Per Cent Stover	Per Cent Ears	Pounds of Ears to Shell One Bushel of Shelled Corn	Weight of Measured Bushel of Shelled Corn	Weight of Cobs from Bushel of Shelled Corn	Per Cent Grain	Per Cent Cob	Pounds Stover	Pounds Ears	Bushels of Shelled Corn	
1	Jarvis' Golden Prolific.....	265	103.0	40.5	375	1.42	3	150	111	1	237.0	205.5	53.54	46.44	67.5	57.0	10.5	84.44	15.56	4740	4110	60.8	
2	Southern Beauty.....	255	112.1	51.3	360	1.41	5	140	110	0	219.0	196.5	55.8	44.11	66.0	56.5	9.5	85.61	14.39	4980	3930	59.6	
3	Coker's Williamson.....	246	119.8	68.6	281	1.14	12	187	47	0	253.0	193.5	56.66	43.33	66.5	57.0	9.5	85.71	14.29	5060	3870	58.2	
4	First Generation Cross No. 182.....	254	110.0	45.9	270	1.06	2	234	18	0	194.0	193.5	50.06	49.91	66.0	56.0	11.0	83.58	16.42	3880	3870	57.8	
5	Southern Snow Flake.....	257	116.2	52.9	263	1.02	7	237	13	0	247.0	179.0	57.98	42.02	63.0	53.5	9.5	84.92	15.08	4910	3580	56.8	
6	Batis' Four Ear.....	251	107.9	52.8	407	1.60	4	100	143	7	279.0	190.0	59.41	40.51	68.0	56.5	11.5	83.09	16.91	5580	3800	56.0	
7	Latham's Double.....	255	122.1	60.9	318	1.24	13	170	74	0	308.0	178.5	67.34	32.66	61.5	54.0	10.5	83.72	16.28	7360	3570	55.4	
8	Wannamaker.....	247	126.8	67.6	359	1.45	5	126	115	1	335.0	194.5	63.27	36.73	70.5	57.0	13.5	81.85	19.15	6700	3890	55.2	
9	Parker's Prolific.....	264	102.7	40.4	338	1.28	2	186	76	0	233.0	186.0	55.61	44.39	68.5	55.0	13.5	80.29	19.17	4660	3720	54.4	
10	Deaton's Favorite.....	252	119.8	55.4	260	1.03	8	228	16	0	256.0	173.5	59.61	40.39	61.0	53.0	11.0	82.81	17.19	5120	3470	54.2	
11	Wyatt's Improved Yellow.....	257	106.8	46.3	260	1.01	5	244	8	0	255.0	187.5	57.66	42.37	69.5	55.5	14.0	79.16	20.84	5100	3750	53.4	
12	Weekley's Improved.....	245	117.8	53.2	375	1.55	4	108	132	1	247.0	184.0	57.31	42.69	69.0	57.0	12.0	82.61	17.39	4910	3680	53.2	
13	Coker's Prolific.....	261	116.2	60.1	370	1.41	4	116	109	2	218.0	182.0	54.56	45.50	69.5	58.0	11.5	83.45	16.55	4360	3640	52.4	
14	Marlboro Prolific.....	255	120.3	65.4	324	1.24	7	178	73	0	303.0	174.0	63.56	36.48	66.5	55.0	11.5	82.71	17.29	6060	3480	52.4	
15	Eureka.....	242	126.0	62.4	278	1.11	6	194	42	0	436.0	173.5	71.55	28.47	66.5	56.0	10.5	84.11	15.89	8720	3470	52.2	
16	Biggs' Seven Ear.....	253	114.1	56.3	465	1.84	6	177	75	0	290.0	168.0	63.36	36.68	65.5	55.5	10.0	84.73	15.27	5800	3360	51.2	
17	Gerrick's Prolific.....	245	118.3	63.1	359	1.37	12	109	122	2	366.0	156.5	70.07	29.95	62.5	51.5	11.0	82.40	17.60	7320	3130	50.0	
18	Columbia Beauty.....	241	113.1	51.6	262	1.07	4	218	22	0	240.0	161.0	59.87	40.15	65.0	54.0	11.0	83.08	16.92	4800	3220	49.6	
19	Experiment Station Yellow, No. 816.....	238	121.0	63.4	322	1.35	10	134	94	0	354.0	179.0	66.43	33.58	73.0	60.0	13.0	82.31	17.69	7080	3580	48.8	
20	Lippard's Improved.....	255	116.5	56.3	335	1.32	3	165	85	0	411.0	149.5	73.31	26.69	61.5	51.5	10.0	83.74	16.26	8220	2990	48.6	
21	Boone County White.....	235	112.3	51.6	237	1.01	10	213	12	0	184.0	143.5	56.18	43.82	63.5	54.5	11.0	83.21	16.79	3680	2870	47.4	
22	Henry Grady, No. 922.....	219	122.6	69.3	277	.96	15	191	13	0	363.5	154.0	70.24	29.76	65.5	54.0	11.5	82.44	17.56	7270	3080	47.0	
23	Hickory King.....	264	106.3	38.8	277	1.05	3	245	16	0	228.0	152.5	59.91	40.07	66.0	53.5	12.5	81.06	18.94	4560	3050	46.2	
24	Shenandoah White Dent.....	243	102.3	42.1	248	1.02	6	226	11	0	190.5	156.0	54.98	45.02	68.5	56.5	12.0	82.48	17.52	3810	3120	45.6	
25	Blount's Prolific.....	255	112.6	52.4	338	1.33	8	156	91	0	221.0	155.5	58.76	41.30	69.0	57.0	12.0	82.03	17.97	4420	3110	42.6	

TABLE V.—COMPILED RESULTS OF VARIETY TEST OF CORN—REDELL TEST FARM.

Rank According to Yield Per Acre in Bushels of Shelled Corn		Yield Per Acre										Average for Five Years	
		1911	1912	1913	1914	1915	Pounds of Stover	Bushels of Shelled Corn	Pounds of Stover	Bushels of Shelled Corn	Pounds of Stover	Pounds of Shelled Corn	Pounds of Shelled Corn
1	Southern Beauty.....	2460	38.3	2023	38.2	3765	57.6	1890	34.9	4980	59.6	3030	45.7
2	Weekley's Improved.....	3200	38.9	1964	34.3	4738	66.7	2130	33.7	4910	53.2	3291	45.4
3	Biggs' Seven Ear.....	2700	32.4	2297	45.0	3335	48.8	2160	40.2	3780	50.0	2851	43.3
4	Parker's Prolific.....	2540	34.0	2071	41.4	2783	42.7	2085	34.3	4060	54.4	2828	41.4
5	Cooke's Prolific.....	2500	36.4	1904	34.0	2820	47.9	1860	34.0	4360	52.4	2604	40.9
6	Batts' Four Ear.....	3000	36.9	2202	35.2	4508	42.7	2360	30.2	5580	56.0	3552	40.2
7	Marlboro Prolific.....	2800	31.2	2191	34.0	3107	42.8	2355	31.1	6000	52.4	3321	38.1
8	Goodman's Prolific.....	2700	31.8	2666	38.0	2184	32.6	2700	36.1	5800	51.2	3270	37.9
9	Columbia Beauty.....	2220	32.6	2380	35.7	3588	47.4	1500	22.7	1800	19.6	2916	37.6
10	Eureka.....	3360	32.8	3023	35.0	3280	35.7	2640	24.7	8720	52.2	4266	36.1
11	Hickory King.....	2900	31.6	2194	36.2	3280	36.4	1440	26.2	4560	46.2	2876	35.9
12	Boone County White.....	2600	35.1	2112	40.3	1702	23.3	1290	20.9	3680	47.0	2463	34.4

Rank According to Yield Per Acre in Bushels of Shelled Corn

rainfall* amounted to only 39.46 inches, or 10.14 inches less than the normal. The soil type at the Central Farm is Cecil Sandy Loam.

A list of the varieties and results of the test at the Central Farm are included in Table VI.

These results show a range in yield between 14 and 32.8 bushels per acre, giving a difference of 18.8 bushels between the lowest and highest yielding variety. In this test the more prolific varieties are decidedly the highest yielders.

Nineteen of the above varieties have been tested for three years at the Central Farm. A summary of their results are included in Table VII. The average yields for these varieties range between 15.6 and 27.9 bushels per acre, giving a difference of 12.3 bushels between the lowest and highest yielding variety. With the exception of First Generation Cross No. 182, the leading varieties in this series of tests are among the more prolific corns. First Generation Cross No. 182 is a one-eared corn originated by the U. S. Department of Agriculture. The variety was selected from a cross between Boone County White and Hickory King.

* U. S. Weather Bureau, Climatological Data, N. C. Section, 1915.

TABLE VI.—VARIETY TEST OF CORN AT THE CENTRAL STATION, 1915.

Rank According to Yield Per Acre in Bushels of Shelled Corn	Varieties	Average Height in Inches at Maturity			Number Ears	Number of Stalks Bearing			Yield Per Plant and Related Data				Shelling Capacity				Yield Per Acre						
		Stalks	Ears	Plants		Per Plant	Per Stalk	Average	No Ears	One Ear	Two Ears	Three or More Ears	Pounds of Stover	Pounds of Ears	Per Cent Stover	Per Cent Ears to Shell One Bushel	Weight of Bushel of Shelled Corn	Weight of (Cobs from Bushel of Shelled Corn)	Per Cent Grain	Per Cent Cob	Pounds Stover	Pounds Ears	Bushels of Shelled Corn
1	Biggs' Seven Ear	185	97.55	12.65	355	1.92	3	41	50	30	99.50	113.00	16.82	53	18	69.06	56.50	12.50	1990	2260	32.8		
2	Batts' Four Ear	197	98.15	19.65	285	1.45	4	106	82	5	109.50	106.50	50.69	49	31	75.00	56.50	13.50	2190	2130	30.4		
3	Weekley's Improved	203	99.75	46.70	278	1.37	2	124	77	0	106.50	108.50	49.53	50	47	75.00	58.00	17.00	2130	2170	29.0		
4	Southern Beauty	200	92.65	50.30	231	1.16	10	149	41	0	102.25	87.15	53.81	16	19	62.73	52.75	10.00	2185	1775	28.0		
5	Parker's Profile	197	93.20	38.40	212	1.08	9	161	24	0	95.25	90.75	51.24	19	79	68.50	55.25	13.25	2055	1815	26.4		
6	Lippard's Improved	180	96.60	43.70	205	1.11	10	137	32	1	94.25	81.50	53.65	16	37	66.00	51.50	11.50	1855	1625	25.0		
7	Goodman's Profile	223	99.40	12.00	233	1.01	17	173	27	0	100.25	80.75	53.33	41	61	66.00	56.00	10.00	2015	1615	24.6		
8	Coke's Profile	200	101.00	15.40	217	1.09	12	164	27	1	83.00	84.50	49.55	50	45	73.25	56.75	16.50	2030	1600	24.0		
9	First Generation Cross No. 182	205	86.80	37.00	195	.96	9	195	1	0	71.00	76.00	48.36	51	70	67.00	51.00	11.00	1820	1430	22.6		
10	Latham's Double	174	98.55	50.70	192	1.10	8	116	26	0	91.00	71.50	56.00	44	60	65.00	51.00	11.00	1820	1430	22.6		
11	Jarvis' Golden Profile	161	87.30	31.70	182	1.11	17	129	31	0	78.50	76.50	50.65	49	55	70.50	56.00	14.50	1795	1570	21.8		
12	Gerrick's Profile	158	104.00	49.50	219	1.18	7	92	51	0	101.50	76.00	57.18	42	52	73.00	57.00	16.00	2050	1520	20.8		
13	Blount's Profile	206	88.40	38.10	238	1.16	14	116	46	0	95.00	78.00	51.91	43	69	76.50	58.50	18.00	1960	1560	20.4		
14	Marlboro Profile	173	96.85	47.95	196	1.13	9	132	32	0	85.00	69.00	55.19	41	51	72.50	57.00	15.50	1700	1380	19.0		
15	Denton's Favorite	171	105.65	52.70	161	.91	20	141	10	0	93.75	63.50	59.61	40	39	69.00	55.25	13.75	1875	1575	18.8		
16	Hickory King	197	86.55	38.50	187	.95	20	167	10	0	75.50	62.75	54.61	45	39	67.00	55.00	12.00	1900	1560	20.4		
17	Boone County White	147	80.90	12.50	141	.96	8	137	2	0	59.00	58.25	50.32	49	68	75.50	50.50	12.25	1700	1380	19.0		
18	Wanamaker	150	107.15	53.70	160	1.13	15	102	32	1	96.75	69.50	56.63	43	37	78.50	57.25	21.25	1875	1575	18.8		
19	Wyatt's Improved Yellow	207	81.00	33.90	190	.92	18	186	2	0	103.00	67.25	60.50	39	50	77.50	55.50	22.00	1815	1390	17.6		
20	Eureka	217	88.95	41.60	209	.96	18	189	10	0	120.00	65.50	61.69	35	34	77.00	56.50	20.50	2000	1310	17.0		
21	Southern Snow Flake	180	89.55	38.50	174	.97	11	164	5	0	75.00	61.00	55.45	41	55	71.50	55.25	18.25	1740	1225	17.0		
22	Coker's Williamson	120	106.45	55.95	117	.98	17	89	14	0	87.25	47.50	61.75	35	25	74.75	51.00	22.75	1500	1225	17.0		
23	Columbia Beauty	189	92.40	40.50	160	.85	32	154	3	0	80.50	50.00	61.69	38	31	67.50	55.00	12.50	1610	950	16.0		
24	Shenandoah White Dent	135	92.80	39.50	130	.96	7	127	0	1	52.50	47.50	52.50	47	50	68.25	51.25	11.00	1650	950	14.0		

*The poor stand of some of the varieties was due to unfavorable conditions which followed the planting. The actual yields are reported.

TABLE VII.—COMPILED RESULTS OF VARIETY TEST OF CORN—CENTRAL STATION.

Rank According to Yield Per Acre in Bushels of Shelled Corn	Varieties	Yield Per Acre							
		1913		1914		1915		Average for Three Years	
		Pounds of Stover	Bushels of Shelled Corn	Pounds of Stover	Bushels of Shelled Corn	Pounds of Stover	Bushels of Shelled Corn	Pounds of Stover	Bushels of Shelled Corn
1	Biggs' Seven Ear.....	3310	34.0	2360	16.8	1990	32.8	2553	27.9
2	First Generation Cross No. 182.....	2410	34.2	2080	21.1	1120	22.6	1980	26.0
3	Cocke's Prolific.....	3580	33.0	2240	13.3	1660	21.0	2493	23.4
4	Southern Beauty.....	2500	28.0	1920	13.3	2045	28.0	2155	23.1
5	Jarvis' Golden Prolific.....	3540	32.7	1880	13.5	1570	21.8	2330	22.7
6	Weekley's Improved.....	3040	25.5	2000	12.0	2130	29.0	2390	22.2
7	Parker's Prolific.....	2940	26.9	2240	13.1	1905	26.4	2362	22.1
7	Batts' Four Ear.....	3680	27.0	2380	8.8	2190	30.4	2750	22.1
8	Marlboro Prolific.....	3480	32.3	2520	9.8	1700	19.0	2567	20.4
9	Hickory King.....	3680	26.6	1760	14.2	1510	18.8	2317	19.9
10	Blount's Prolific.....	3180	25.5	1920	13.3	1900	20.4	2333	19.7
11	Goodman's Prolific.....	2500	23.3	2160	8.2	2005	24.6	2222	18.7
12	Boone County White.....	2210	19.5	2000	17.6	1180	18.6	1797	18.6
13	Columbia Beauty.....	2440	21.8	1680	17.9	1610	14.8	1910	18.2
14	Latham's Double.....	3460	23.8	2400	8.2	1820	22.0	2560	18.0
15	Eureka.....	3740	26.2	2240	6.8	2400	17.0	2793	16.7
16	Deaton's Favorite.....	2600	20.0	1960	11.0	1875	18.8	2145	16.6
17	Gerrick's Prolific.....	3960	18.9	2900	7.2	2030	20.8	2963	15.6
17	Shenandoah White Dent.....	2270	19.8	1480	13.1	1050	14.0	1600	15.6

THE GRANVILLE TEST FARM.

The Granville Farm is located in the northeastern portion of the Piedmont section about one mile southwest of Oxford. The soil of this farm is of the Durham Sandy Loam type. The plat used for the corn variety tests is low in fertility, though it furnishes a fair representative of the soils of this section.

The varieties and results of this test are included in Table VIII.

At this farm the varieties ranged in yield between 19.4 and 30.4 bushels of shelled corn per acre, a difference of 11 bushels between the highest and lowest yielding variety. Tests have not been made at this farm a sufficient number of years to determine the varieties best suited to the section.

THE EDGECOMBE TEST FARM.

The Edgecombe Farm is located in the upper western portion of the Coastal plain, about seven miles southeast of Rocky Mount. The soil used for the corn variety test is of the Norfolk Sandy Loam type. Although the rainfall was somewhat less than normal the past season has been unusually good for corn growing in this section.

TABLE VIII.—VARIETY TEST OF CORN AT THE GRANVILLE TEST FARM, 1915.

Rank According to Yield Per Acre in Bushels of Shelled Corn	Varieties	Average Height in Inches at Maturity		Number Ears	Number of Stalks Bearing—	Yield Per Plot and Related Data			Shelling Capacity			Yield Per Acre									
		Stalks	Ears			Per Plot	Average Per Stalk	Number of Stalks Per Plot			Pounds of Stover	Pounds of Ears	Per Cent Stover	Per Cent Ears	Pounds of Shelled Corn	Weight of Shelled Corn from Bushel of Cobs	Per Cent Grain	Per Cent Cob	Pounds Stover	Bushels of Shelled Corn	
								No Ears	One Ear	Two Ears											Three or More Ears
1	Eureka.....	250	89.45	31.35	246	.98	5	244	1	0	91.0	111.0	45.05	54.95	73.0	59.0	11.0	80.82	19.1	1820	30.4
2	Latham's Double.....	228	74.25	23.60	248	.96	10	248	0	0	82.0	96.0	46.07	53.93	68.0	56.0	12.0	82.35	17.65	1610	28.2
3	Deaton's Favorite.....	238	74.75	24.00	228	.96	10	228	0	0	69.0	94.0	42.33	57.67	67.0	55.0	12.0	82.00	17.91	1380	28.0
4	Batts' Four Ear.....	256	72.50	20.00	252	.98	10	240	6	6	73.0	93.0	43.98	56.02	67.0	54.0	13.0	80.60	19.40	1160	27.8
5	Lippard's Improved.....	244	71.25	22.50	230	.94	14	230	0	0	59.0	87.0	40.41	59.59	61.5	55.5	9.0	86.05	13.95	1180	27.0
6	Marlboro Prolific.....	245	76.10	20.00	238	.96	9	234	2	0	61.0	93.0	40.76	59.24	71.0	57.5	13.5	80.99	19.01	1280	26.2
6	Biggs' Seven Ear.....	252	66.40	20.30	271	1.08	4	225	23	0	59.0	91.5	39.20	60.80	70.0	57.5	12.5	82.11	17.89	1180	26.2
7	Weekley's Improved.....	241	75.70	23.30	237	.98	8	229	4	0	62.0	93.0	40.00	60.00	71.5	59.0	12.5	82.52	17.48	1210	26.0
7	Wyatt's Improved Yellow.....	244	69.60	19.95	232	.95	12	232	0	0	51.0	87.0	38.30	61.70	67.0	56.0	11.0	83.58	16.42	1080	26.0
8	Coker's Williamson.....	241	78.75	27.40	225	.97	20	225	1	0	90.0	85.0	51.43	48.57	66.0	53.5	12.5	81.06	18.94	1800	25.8
9	Columbia Beauty.....	231	69.55	19.80	212	.95	19	212	0	0	48.0	83.5	36.50	63.50	65.5	57.0	8.5	87.02	12.98	960	25.4
10	Southern Snow Flake.....	238	73.40	21.00	226	.97	13	226	0	0	51.0	86.0	37.23	62.77	69.0	56.0	13.0	81.16	18.84	1020	25.0
11	Goodman's Prolific.....	253	80.30	27.75	238	.94	15	236	4	0	58.0	84.0	41.73	58.27	66.0	56.0	10.0	84.85	15.15	1160	24.6
12	Southern Beauty.....	246	69.40	19.90	229	.93	15	225	2	0	52.5	76.0	40.86	59.14	63.0	53.0	10.0	84.13	15.87	1050	24.2
13	Jarvis' Golden Prolific.....	242	63.95	17.95	237	.98	7	233	2	0	52.0	81.5	38.95	61.05	68.0	55.0	11.0	83.82	16.18	1010	24.0
14	First Generation Cross No. 182.....	238	67.90	16.60	229	.96	5	229	0	0	50.5	80.0	38.70	61.30	67.5	57.5	10.0	85.15	14.85	1010	23.8
15	Wanamaker.....	240	81.05	28.10	232	.97	10	228	2	0	80.5	83.5	49.00	50.91	72.0	58.0	11.0	80.50	19.50	1610	23.2
16	Gerriek's Prolific.....	235	83.30	26.70	221	.94	18	213	4	0	98.0	84.0	53.85	46.15	73.0	57.0	16.0	78.00	21.90	1960	23.0
17	Coker's Prolific.....	245	83.10	34.00	230	.94	18	224	3	0	56.0	80.0	41.48	58.52	70.0	58.4	12.0	82.00	17.11	1120	22.8
18	Parker's Prolific.....	231	70.90	21.40	219	.95	12	219	0	0	45.0	77.0	36.80	63.20	68.0	55.0	13.0	80.88	19.12	980	22.6
19	Boone County White.....	206	77.25	21.70	195	.93	14	192	0	0	40.0	74.0	36.04	63.96	65.5	55.0	10.5	83.95	16.05	800	21.6
20	Shenandoah White Dent.....	213	79.20	20.30	195	.93	14	199	0	0	38.0	71.0	33.04	66.96	70.0	55.0	12.0	82.81	17.11	770	20.2
21	Blount's Prolific.....	236	78.20	22.75	222	.94	14	222	0	0	49.0	67.0	42.24	57.76	67.0	57.0	10.0	85.07	14.93	980	20.0
22	Hickory King.....	219	62.30	15.50	212	.97	7	212	0	0	31.5	61.5	34.85	65.15	66.5	55.0	11.5	82.71	17.29	690	19.4

TABLE IX.—VARIETY TEST OF CORN AT THE EDGECOMBE TEST FARM, 1915.

Rank According to Yield Per Acre in Bushels of Shelled Corn	Varieties	Average Height in Inches at Maturity		Number of Ears	Number of Stalks Bearing—			Yield Per Plot and Related Data			Shelling Capacity			Yield Per Acre						
		Stalks	Ears		Per Plot	Average Per Stalk	No Ears	One Ear	Two Ears	Three or More Ears	Pounds of Stalks	Pounds of Ears	Per Cent Stalks Bearing		Pounds of Shelled Corn	Per Cent (Corn)	Pounds Stalks	Pounds Shelled	Per Cent (Sh)	Yield Per Acre
1	Latham's Double	260	118.0	54.1	338	1,330	4	176	72	2,204, 25,201, 25	50.37	49.65	63.5	55.6	8.5	86.61	13.38	405.5	402.5	63.4
2	Biggs' Seven Ear	252	112.9	54.6	320	2,410	2	40	154	56,177, 75,218, 25	41.80	55.11	69.0	59.0	10.0	85.51	14.49	355.5	436.5	63.2
3	Marlboro Prolific	249	118.1	59.3	382	1,535	5	106	138	0,207, 00,217, 00	48.82	51.18	69.5	58.0	11.5	83.45	16.55	414.0	434.0	62.1
4	Gerrick's Prolific	219	122.3	61.4	445	1,775	6	55	174	14,227, 00,220, 00	50.78	49.22	72.4	59.0	13.0	81.94	18.06	454.0	410.0	61.2
5	Jarvis' Golden Prolific	406	104.2	40.9	406	1,537	3	107	148	11,844, 00,209, 00	46.82	53.18	68.5	58.0	10.7	84.67	15.33	368.0	418.0	61.0
6	Weekley's Improved	264	114.4	54.0	435	1,665	8	88	157	11,183, 25,215, 75	45.93	54.07	71.0	59.0	12.6	83.10	16.90	366.5	431.5	60.8
7	Coke's Prolific	257	114.2	55.5	410	1,539	1	104	150	2,172, 50,208, 50	47.90	52.10	69.5	58.0	11.5	83.47	16.53	345.0	417.0	60.0
8	Southern Beauty	211	109.6	50.3	355	1,662	4	76	138	1,156, 00,191, 00	44.96	55.04	61.6	55.5	8.5	86.72	13.28	312.0	382.0	59.6
9	Coker's Williamson	218	122.7	70.1	327	1,327	1	147	90	0,202, 00,195, 00	50.88	49.12	66.0	56.0	10.0	84.87	15.13	101.0	390.0	59.0
10	Lippard's Improved	249	109.6	51.4	344	1,338	3	150	95	1,188, 75,198, 75	48.71	51.29	68.5	58.0	10.5	81.67	18.33	377.5	397.5	58.0
11	Wannamaker	262	113.3	54.0	363	1,445	4	125	131	2,194, 50,205, 50	46.12	53.88	71.5	59.0	12.5	82.52	17.48	386.0	410.0	57.4
12	Goodman's Prolific	266	108.7	50.4	385	1,445	6	137	121	2,158, 75,180, 75	45.61	54.39	66.0	57.0	9.0	86.36	13.64	347.5	378.5	57.4
13	Batts' Four Ear	257	112.3	56.7	478	1,896	3	58	170	26,189, 50,198, 50	18.51	51.46	69.5	59.5	10.0	85.61	14.39	379.0	397.0	57.2
14	Parker's Prolific	258	106.5	45.9	358	1,336	5	118	105	0,155, 50,194, 50	44.43	55.57	70.5	58.5	12.0	82.48	17.52	311.0	389.0	55.2
15	First Generation Cross No. 12	230	108.0	43.2	249	1,082	2	207	21	0,128, 25,171, 75	42.33	57.67	65.0	55.0	10.0	84.62	15.38	295.5	349.5	53.8
16	Deaton's Favorite	227	117.3	52.8	258	1,114	6	181	37	0,186, 50,179, 50	50.90	49.10	68.0	57.0	11.6	83.82	16.18	379.0	359.0	52.1
17	Eureka	196	120.2	57.4	248	1,255	5	145	56	1,188, 75,178, 75	51.47	48.57	69.5	58.0	11.7	83.45	16.55	377.5	357.5	51.2
18	Southern Snow Flake	227	109.6	49.3	243	1,076	6	200	20	1,143, 00,167, 00	46.15	53.87	66.0	55.0	11.0	83.33	16.67	280.0	334.0	50.3
19	Wyatt's Improved Yellow	246	110.0	45.7	241	99	11	226	9	0,168, 75,172, 25	49.37	50.67	70.0	56.0	14.0	80.00	20.00	337.5	344.5	49.2
20	Blount's Prolific	241	106.4	51.6	323	1,341	5	151	82	2,150, 50,153, 50	49.51	50.49	71.0	60.0	11.0	84.51	15.49	301.0	307.0	43.2
21	Columbia Beauty	211	107.7	48.4	246	1,092	6	195	9	1,100, 50,139, 50	50.18	49.82	67.0	56.5	10.5	84.33	15.67	284.0	279.0	41.6
22	Shenandoah White Dent	197	109.5	48.1	207	1,057	7	163	19	0,106, 00,131, 00	44.73	55.27	67.5	58.0	9.7	85.43	14.57	212.0	292.0	38.8
23	Roane County White	185	110.6	45.4	195	1,065	7	161	17	0,118, 75,133, 25	47.44	52.86	71.5	56.0	15.4	78.32	21.68	237.5	296.5	37.2
24	Hickory King	227	102.3	43.4	230	1,065	7	201	19	0,128, 25,123, 75	50.91	49.09	68.5	57.0	11.5	83.21	16.79	256.5	247.5	36.2

The results of the test are included in Table IX.

The highest yielding variety of the test produced 63.4 bushels of shelled corn per acre, the highest yield produced in the series of tests. The lowest yielding variety produced 36.2 bushels of shelled corn per acre, 27.2 bushels less than the highest. In the test at this farm all the varieties produced a higher number of ears per stalk and a fewer number of barren stalks than at any of the other farms. The two-eared varieties are decidedly in the lead in this section.

In four previous tests, twelve of the above varieties have been compared for grain and stover production. The compiled results of these tests have been included in Table X. In this section the series of five tests has given first place to Marlboro Prolific with Bigg's Seven-ear a close second. Boone County White, a variety which has ranked well in tests in the western part of the State, has given the lowest average yield here.

THE WASHINGTON TEST FARM.

The Washington Farm is located in the northeastern portion of the Coastal plain, about eleven miles north of Belhaven. The soil at this farm is muck. The muck extends down two to three feet to a fine sandy clay subsoil. The farm has recently been cleared and is not yet in a good stage of cultivation.

The corn varieties gave a fair stand early in the season; but failed to develop except in irregular spots. The spots are said to be places where stumps and logs were burned. Some of these spots were still marked by partly burned logs or stumps, while others showed no evidence of having been burned. These spots were so distributed about the plats as to make a comparison of yield unfair. Notes taken on portions of the plats away from the spots rank Latham's Double, Coker's Williamson and Wannamaker's Prolific among the best in the test.

RELATION OF NUMBER OF EARS PER STALK TO YIELD.

At present there seems to be a difference of opinion in regard to the value of one-eared, two-eared, and the more prolific corns in the different sections of the State. Until recently, the one-eared varieties have been most popular in the extreme western and eastern portions of the State. More recently the one-eared varieties are being replaced by the two-eared and more prolific varieties. Whether this is due to natural merits of the prolific varieties or to the fact that more attention has been giving to their breeding, has not been determined. The fact remains that the prolific varieties have led in all of the tests except in those located at the Buncombe Farm. At the Buncombe Farm, Boone County White came first in an average of five years' tests, but gave only a very slight lead over the prolific varieties.

Corn varieties, such as Biggs' Seven-ear and Batts' Four-ear, have no doubt been originated with the idea of increasing the yield by increasing

TABLE X.—COMPILED RESULTS OF VARIETY TEST OF CORN—EDGEcombe TEST FARM.

Rank According to Yield Per Acre in Bushels of Shelled Corn	Varieties	Yield Per Acre										Average for Five Years	
		1911		1912		1913		1914		1915			
		Pounds of Stover	Bushels of Shelled Corn	Pounds of Stover	Bushels of Shelled Corn	Pounds of Stover	Bushels of Shelled Corn	Pounds of Stover	Bushels of Shelled Corn	Pounds of Stover	Bushels of Shelled Corn		
1	Marlboro Prolific	1950	22.7	1280	24.5	3536	42.9	4600	36.4	4140	62.4	3101	37.8
2	Biggs' Seven Ear	2080	26.5	2200	27.1	2244	31.1	3030	30.8	3555	63.2	2622	37.5
3	Weekley's Improved	1590	20.6	1210	19.4	3077	41.9	5190	37.6	3665	60.8	2652	36.7
4	Batts' Four Ear	1900	26.0	990	20.1	3638	46.6	4480	30.6	3790	57.2	2960	36.1
5	Goodman's Prolific	1860	26.3	2860	22.0	2686	38.2	4060	35.8	3475	57.4	2928	35.9
6	Parker's Prolific	1190	23.4	1450	25.0	2414	43.1	4000	32.5	3110	55.2	2433	35.8
7	Cooke's Prolific	1480	25.6	2280	18.8	2516	38.0	3180	31.9	3450	60.0	2611	34.9
8	Eureka	3210	25.9	2970	20.4	3060	31.8	4880	38.8	3775	51.2	3579	33.6
9	Southern Beauty	1760	27.6	1750	15.0	1190	22.5	4200	34.1	3120	59.6	2404	31.8
10	Columbia Beauty	1610	23.3	2020	15.4	1547	21.5	4120	37.7	2810	41.6	2421	27.9
11	Hickory King	2120	24.3	960	19.1	1853	25.0	2980	31.5	2565	36.2	2906	27.2
12	Boone County White	2400	21.4	1460	16.2	1584	23.4	3500	35.3	2375	37.2	2263	26.7

the number of ears per stalk. Selecting may go too far in this direction. Since more than 90 per cent of the corn grown in the State is harvested by hand, the extra labor and waste necessary in the harvesting of a large number of small ears and nubbins is very evident. The larger number of ears are usually accompanied by a large quantity of damaged grains.

During the past season data has been secured on the number and weight of good ears for each variety tested. Since the varieties hold practically the same relation on each farm, the results from all of the farms have been averaged and arranged in Table XI. The varieties are arranged according to percentages of nubbins by count. Biggs' Seven-ear gave the highest percentage of nubbins and First Generation Cross No. 182 the lowest. Nearly 43 per cent of the ears borne by Biggs' Seven-ear were nubbins, and their weight amounted to 28.79 per cent of the total weight of ears. These results suggest some of the advantages that may come from selecting our best two-eared varieties for increase yield of grain per stalk, rather than increasing unduly the number of ears per stalk.

The question is often raised as to which is the best for ensilage, the large one-eared corns or the prolific sorts. In answering this question one should consider both the quantity and quality of material secured from each. Although the large one-eared corns may produce a larger quantity of ensilage the quality and food value is not so good as that from the prolific varieties. The results of the variety tests furnish some data for this comparison. Although no weights were taken at the ensilage stage, weights of the dried stover and ears should furnish a fair comparison. Weights from four of the most prolific varieties and four of the largest one-eared varieties are compared in Table XII. The four prolific varieties gave an average yield of 2,669 pounds of dry stover and 2,868 pounds of ears with a total yield of 5,537 pounds of dry stover and ears. The four one-eared varieties produced an average of 2,425 pounds of dried stover and 2,247 pounds of ears, giving a total weight of 4,672 pounds per acre. In these tests the prolific varieties have produced a larger quantity of ears and stover. Eureka, one of the popular ensilage corns, produced 3,755 pounds of dry stover and 2,521 pounds of ears, while Weekley's Improved, a prolific variety, yielded 2,775 pounds of dry stover and 2,957 pounds of ears per acre. Though Eureka produced more stover by 980 pounds, Weekley's Improved yielded more ears by 436 pounds per acre. Although the total yield from Weekley's Improved is less than Eureka by 540 pounds per acre, its food value is greater on account of its higher production of grain. Other large varieties would no doubt yield more ensilage than the one-eared varieties of this test. The larger corns, however, produce ensilage of lower food value on account of their low yield of grain. In such comparison one should consider the total food value rather than amount of ensilage secured. The above results indicate that the prolific varieties will produce a greater quantity of actual food per acre.

TABLE XI.—AVERAGES SHOWING RELATION OF GOOD EARS TO NUBBINS OF THE VARIETIES TESTED.

Varieties	Weight				Number by Actual Count			
	Good Ears	Nubbins	Total	Per Cent Nubbins	Good Ears	Nubbins	Total	Per Cent Nubbins
Biggs' Seven Ear	107.43	43.31	150.41	28.79	266	199	465	42.80
Batts' Four Ear	126.25	29.13	155.38	18.75	280	153	433	35.33
Gerriek's Prolific	113.31	25.14	138.75	18.34	226	122	348	35.06
Southern Beauty	124.41	27.31	151.75	18.00	208	107	315	33.97
Wannamaker	121.13	22.25	143.38	15.52	226	104	330	31.52
Lippard's Improved	116.56	19.50	136.06	14.33	209	92	301	30.56
Goodman's Prolific	112.00	23.38	135.38	17.27	230	100	330	30.30
Marlboro Prolific	118.81	21.94	140.75	15.59	218	94	312	30.13
Boone County White	92.88	13.50	106.38	12.69	140	57	197	28.93
Weekley's Improved	131.44	25.88	157.32	16.45	271	110	381	28.87
Latham's Double	129.75	21.69	151.44	14.32	215	87	302	28.81
Blount's Prolific	105.41	18.75	124.19	15.10	228	90	318	28.30
Columbia Beauty	97.75	15.63	113.38	13.79	156	60	216	27.78
Southern Snow Flake	111.00	13.75	124.75	11.02	162	60	222	27.03
Wyatt's Improved Yellow	119.56	14.44	134.00	10.78	170	61	231	26.41
Coker's Williamson	117.25	17.50	134.75	12.99	199	68	267	25.47
Eureka	111.00	13.69	124.69	10.98	202	69	271	25.46
Jarvis Golden Prolific	127.18	19.06	146.24	13.03	253	85	338	25.15
Cocke's Prolific	133.06	18.06	151.12	11.95	276	89	365	24.38
Shenandoah White Dent	92.69	12.31	105.00	11.72	149	47	196	23.98
Hickory King	96.25	12.63	108.88	11.60	189	59	248	23.79
Parker's Prolific	131.50	16.31	147.81	11.03	241	71	312	22.76
Deaton's Favorite	123.38	13.25	136.63	9.70	177	52	229	22.71
First Generation Cross No. 182	129.31	12.25	141.56	8.65	197	50	247	20.24

TABLE XII.—COMPARISON OF PROLIFIC AND ONE-EARED VARIETIES FOR ENSILAGE.

Prolific Varieties				One-eared Varieties			
	Pounds of Stover Per Acre	Pounds of Ears Per Acre	Total Weight Before Shucking, Per Acre		Pounds of Stover Per Acre	Pounds of Ears Per Acre	Total Weight Before Shucking, Per Acre
Batts' Four Ear	3020	2888	5908	Eureka	3755	2521	6276
Weekley's Improved	2775	2057	5732	Southern Snow Flake	2332	2396	4728
Cocke's Prolific	2474	2798	5272	Boone County White	1817	2036	3853
Biggs' Seven Ear	2409	2827	5236	Shenandoah White Dent	1768	2034	3802
Averages	2669	2868	5537	Averages	2425	2247	4672

SUMMARY.

During the past season twenty-four varieties of corn were tested at six of the experimental farms. These varieties represent some of the best corns grown in this and adjoining States. The farms are so distributed as to represent the different soils and climatic conditions of North Carolina.

Along with the results for 1915 are given the averaged results from four previous tests at four of the farms. These results are guides to the best varieties for the different sections of the State. They point out good varieties which may be developed into even better strains, if properly selected. With the exception of the extreme western part of the State, the two-eared and more prolific corns have yielded best. In the western part of the State, Boone County White, a one-eared variety, gave the highest yield in a series of five tests; but was followed very closely by the two-eared varieties.

It is recommended that growers improve the best two-eared varieties by selecting for increased yield of grain per stalk instead of selecting for a larger number of ears per stalk. The recommendation is based on the following facts:

1. Since more than 90 per cent of the corn grown in the State is gathered by pulling the ears, the handling of a large number of small ears and nubbins would require more labor..

2. The grain from a large number of ears and nubbins contains a greater quantity of trash and damaged grains.

3. Some of the two-eared varieties yield as much grain per acre as the more prolific varieties.

In comparing the two-eared and more prolific varieties with the one-eared varieties for production of ensilage, the two-eared and more prolific varieties have given a higher yield of dry matter and more food value per acre than the one-eared corns. It is pointed out that ensilage corn should not be judged by the quantity of material; but the quantity of actual food it contains. The yield of grain and stover should be considered in the comparison of ensilage corns.

SOURCES OF SEED OF VARIETIES OF CORN DURING THE SEASON OF 1915

<i>Variety.</i>	<i>Source of Seed.</i>	
1. Batts' Four-Ear	J. F. Batts.....Garner, N. C.	
2. Biggs' Seven-Ear	F. P. Shields.....Scotland Neck, N. C.	
3. Blount's Prolific	T. W. Wood & Sons.....Richmond, Va.	
4. Boone County White.....	T. W. Wood & Sons.....Richmond, Va.	
5. Coker's Prolific	Edgecombe Test Farm...Rocky Mount, N. C.	
6. Coker's Williamson	Pedigreed Seed Farm.....Hartsville, S. C.	
7. Columbia Beauty	T. W. Wood & Sons.....Richmond, Va.	
8. Deaton's Favorite	Chas. Deaton	Carthage, N. C.
9. Eureka	T. W. Wood & Sons.....Richmond, Va.	
10. Experiment Station Yellow..	Alabama Experiment Station...	Auburn, Ala.
11. First Generation Cross		
No. 182	Bureau of Plant Industry..	Washington, D. C.
12. Gerrick's Prolific	Bureau of Plant Industry..	Washington, D. C.
13. Goodman's Prolific	J. K. Goodman.....	Mt. Ulla, N. C.
14. Henry Grady	Alabama Experiment Station...	Auburn, Ala.
15. Hickory King	T. W. Wood & Sons.....	Richmond, Va.
16. Jarvis Golden Prolific.....	J. M. Jarvis.....	Winston-Salem, N. C.
17. Latham's Double	F. P. Latham.....	Belhaven, N. C.
18. Lippard's Improved	J. H. Holcomb.....	Hominy, N. C.
19. Marlboro Prolific	Excelsior Seed Farm.....	Cheraw, S. C.
20. Parker's Prolific	T. B. Parker.....	Raleigh, N. C.
21. Shenandoah White Dent....	T. W. Wood & Sons.....	Richmond, Va.
22. Southern Beauty	L. A. Strupe.....	Tobaccoville, N. C.
23. Southern Snow Flake	T. W. Wood & Sons.....	Richmond, Va.
24. Wannamaker	Model Seed Farm.....	St. Matthews, S. C.
25. Weekley's Improved	Iredell Test Farm.....	Statesville, N. C.
26. Wyatt's Improved Yellow....	W. L. Wyatt.....	Raleigh, N. C.

LEAF TOBACCO REPORT FOR FEBRUARY, 1916.

Pounds sold for producers.....	8,839,817
Pounds sold for dealers.....	668,779
Pounds sold for warehouses.....	936,104
 Total	 10,444,700

THE BULLETIN
OF THE
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE
RALEIGH

Vol. 37, No. 5

MAY, 1916

Whole No. 220

**RELATION OF CALCIUM CARBONATE (GROUND
LIMESTONE AND MARL) IN THE SOIL TO
ACID PHOSPHATE AND THE SOIL
PHOSPHATES**

with a few

**FERTILIZER FORMULAS IN WHICH
CALCIUM CARBONATE IS SUB-
STITUTED FOR POTASH**

PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Postoffice at Raleigh, N. C., as second class matter,
February 7, 1901, under Act of June 6, 1900.

EDWARDS & BROUGHTON PRINTING CO.
STATE PRINTERS

LETTER OF TRANSMITTAL

RALEIGH, N. C., June, 15, 1916.

HON. W. A. GRAHAM, *Commissioner of Agriculture*.

SIR:—I have the honor to transmit herewith a paper discussing the use of ground limestone and marl in connection with commercial fertilizers—especially acid phosphate—and beg to recommend its publication as the May BULLETIN from the Division of Botany and Agronomy of this Department.

Respectfully submitted,

JAMES L. BURGESS,

State Agronomist.

Approved:

W. A. GRAHAM,

Commissioner of Agriculture.

Relation of Calcium Carbonate to the Soil Phosphates and Acid Phosphate

BY JAMES L. BURGESS, STATE AGRONOMIST.

Before entering upon a discussion of this important subject it will be well to call attention to two fundamental propositions to which all informed men readily assent without question.

First. No plant can be grown to maturity without phosphorus in the soil solution with which the plant is fed. No plant can ripen seed without the aid of phosphorus, which is necessary to the formation of the germ cells. Phosphorus is, therefore, essential to all normal plant growth and development.

Second. None of our field crops can reach normal maturity without calcium or lime in the soil solution with which the plant is fed. No new plant cells can be formed without the aid of calcium or lime, usually in the form of calcium phosphate. Some plants (as the legumes) are called "lime plants," so necessary is lime to their normal growth. Calcium, or lime, is, therefore, essential to the normal development of our ordinary crops.

It is also a matter of common observation that crops grown in lime or calcareous soils are better nourished and are more capable of withstanding untoward climatic conditions, as drought and early frost, than are crops not so well supplied with lime. It is plain, therefore, that both calcium and phosphorus must be present in the soil at the same time, contributing jointly and simultaneously to the normal development of plant life.

The above facts have been matters of common knowledge so long as to have become axiomatic. We will now look over some of the literature bearing on this subject and see what the most eminent authorities in this and other countries have to say about it.

The value of lime as an aid to crop production was known and practiced in the time of Pliny, and has been increasing in interest and value from his time until the present day. There are, perhaps, a thousand reliable experiments on record that show the use of lime and ground limestone to have very greatly increased crop yields.

Dr. Hilgard, in his excellent work on soils, states: "The instant change of vegetation when we pass from a noncalcareous region to one having calcareous soils has already been alluded to, but it is not necessary to be a botanist to see the change in the PROSPERITY of the rural population as one enters the LIME DISTRICT. The single log cabin, with probably a wooden barrel terminating the mud-plastered chimney,

is replaced, first, by double log houses, then by frame, and, farther on, by brick buildings, with other unmistakable evidences of prosperity. Thus this is seen in passing from the mountainous regions of Kentucky into the blue-grass country, which is throughout underlaid with calcareous formations. Thus, likewise, in crossing the strike of the calcareous formations of Alabama, Mississippi, and Louisiana, or other regions where the underlying formations of calcium have contributed to the formation of the soils, as compared with the adjacent districts where this is not the case. This and other illustrations give rise to the proverb that a "Lime country is a rich country."

EFFECT OF CALCIUM CARBONATE ON THE ACID PHOSPHATE OF THE SOIL IN THE PRESENCE OF IRON AND ALUMINUM OXIDES

We will now discuss the effect of lime in the soil on the availability of soluble phosphoric acid, especially where the soil is heavily charged with the oxides of iron and aluminum. Practically all of the soils of North Carolina, and especially those of the Piedmont and mountain sections, are derived from rocks carrying very large amounts of iron and aluminum. Leading constituents of clayey soils everywhere are silicates and hydrated oxides of aluminum, and the red and yellow colors in all soils and subsoils are due, generally, to the presence of iron oxides. All of our piedmont soils are heavily charged with iron and aluminum compounds, and our coastal plains soils are also well supplied with these chemical bodies. The direct effect, therefore, of these oxides on the soluble phosphoric acid of the soil is well worth our careful consideration.

In E. S. R.,* Vol. 28, No. 3, we find a report of pot experiments with wheat which show that the addition of lime increased the availability of phosphoric acid in such relatively insoluble phosphates as wavellite, an aluminum phosphate, and vivianite, an iron phosphate.

Mr. James E. Halligan of the Louisiana Experiment Station, in his work on "Soil Fertility and Fertilizers," states, page 237: "Most soils contain iron and aluminum which are united with more or less phosphoric acid. These phosphates are very SLIGHTLY soluble in soil solutions, and the addition of LIME LIBERATES SOME OF THE PHOSPHORIC ACID by combining with part of the iron and aluminum phosphates."

In Bulletin No. 46 of the Rhode Island Experiment Station, Dr. Wheeler says, in his discussion of the chemical action of lime on soils, "If lime is present in a soil to which ordinary commercial fertilizer, dissolved bone black, dissolved bone, phosphoric acid or double superphosphates have been added, it is probable that some of the soluble phosphoric acid will further combine with lime, in which condition it may be expected to be MORE READILY AVAILABLE to plants than would have been the case had the lime been absent and a more favor-

*Experiment Station Reports.

able opportunity been given for ALL of the phosphoric acid, not quickly utilized by the plants, to combine with the iron and aluminum oxides." Dr. Wheeler further states, in E. S. R., Vol. 18, No. 7, that "In soils deficient in or devoid of carbonate of lime, but well supplied with the oxides of iron and aluminum, LIME MAY EXTEND THE PERIOD OF EFFICIENCY OF THE SOLUBLE PHOSPHATES, POSSIBLY BY COMBINING WITH MUCH OF THE PHOSPHORIC ACID AT ONCE, AND THUS HOLDING IT IN A MORE ASSIMILABLE COMBINATION THAN IF IT WERE POSSIBLE FOR IT ALL TO UNITE IMMEDIATELY WITH THE IRON AND ALUMINUM OXIDES."

Professor Hilgard, in discussing the relative availabilities of certain forms of phosphorus, states: "On soils containing large amounts of iron and aluminum oxides a high per cent of lime carbonate may offset the small per cent of phosphoric acid, apparently, by bringing about GREATER AVAILABILITY. In general, we find that a lower percentage of potash, phosphoric acid, and nitrogen are adequate when a large proportion of lime carbonate is present. On the other hand, VERY LARGE PERCENTAGES OF FINELY DIVIDED FERRIC HYDRATE, ESPECIALLY IN THE ABSENCE OF LIME CARBONATE, RENDERS EVEN LARGE SUPPLIES OF PHOSPHORIC ACID INERT AND USELESS BY THE FORMATION OF INSOLUBLE FERRIC PHOSPHATES. ALUMINUM HYDRATE ACTS IN A SIMILAR MANNER."

Lucius L. Van Slyke, of the Geneva Experiment Station, New York, says: "Calcium compounds, especially hydrates and carbonates, change insoluble phosphates into forms that can be more readily utilized as plant food. This action is based on the following chemical facts: the phosphates of iron and aluminum are more or less prevalent in the soil. These compounds become soluble only with extreme slowness under ordinary conditions. Calcium compounds, especially hydrates and carbonates, change these insoluble phosphates into tricalcium phosphates which are more readily soluble in water containing carbon dioxide, as in the case of ordinary soil water. The application of the calcium compounds mentioned is, therefore, of marked value in this way in case of soils rich in iron and aluminum compounds and poor in calcium carbonate."

The above is the exact condition found in most of the soils of North Carolina. They are low in lime carbonate content and high in iron and aluminum oxide content.

Dr. Van Slyke further states: "The extent and value of the change involved in this action of certain calcium compounds has not been sufficiently appreciated. Most agricultural writers advise against the use of calcium compounds in soils where soluble calcium phosphate (superphosphate) is used on the ground that PHOSPHORIC ACID WILL BE RENDERED LESS EFFICIENT AS PLANT FOOD. This

objection HAS BEEN GREATLY EXAGGERATED, AS EXPERIMENTS HAVE SHOWN. It has been demonstrated that in the presence of an abundance of calcium carbonate smaller percentages of nitrogen, phosphorus, and potassium compounds are generally required for crop production than when calcium is deficient. The presence of calcium carbonate is of especial value in preventing the formation of the insoluble iron and aluminum phosphates." The above may help to explain why very heavy applications of acid phosphate have been made to certain North Carolina soils with relatively indifferent results.

**EFFECT OF CALCIUM CARBONATE ON ACID PHOSPHATE IN THE SOIL
WHEN THE PRESENCE OF IRON AND ALUMINUM OXIDES
ARE NOT TAKEN INTO THE CONSIDERATION**

A large number of our most eminent authorities on agricultural science have found, by observation and experiment, that the presence of lime carbonate in the soil exerts a most favorable action not only on the natural phosphates, but also on those applied artificially in the form of commercial fertilizers. Should lime carbonate produce a negative effect on the phosphates of the soil, rendering them insoluble and unavailable to the plant, then a "lime country," instead of being a "rich country," would be the poorest country imaginable.

In E. S. R., Vol. 20, No. 2, Messrs. Guthrie and Cohen, in reporting an experiment on the effect of lime on the various soil constituents, state: "The amount of water soluble plant food, however, was larger in the limed than in the unlimed soil, but only in the sandy soil did the liming increase the proportion of water soluble phosphoric acid and potash over that originally present in the soil."

In E. S. R., Vol. 26, No. 4, H. K. Vippond reports an experiment testing the availability of phosphoric acid in the soil as follows: "The general conclusion reached was that a fair amount of lime in the soil assured a fair availability of phosphoric acid."

In Bulletin No. 90 of the Tennessee Experiment Station, Dr. C. A. Moores reports the results of a series of tests in the use of acid phosphate with and without lime, and in all cases and under varying conditions there was a greater crop production from acid phosphate on limed land than on land that was not limed.

In E. S. R., Vol. 18, No. 7, Messrs. Wheeler and Adams, of the Rhode Island Experiment Station, in reporting the tests of nine phosphates, found, as a rule, that soluble phosphates were more effective on limed than on unlimed soils. Lime, INSTEAD OF PROVING INJURIOUS IN CONNECTION WITH SOLUBLE PHOSPHATES, AS IS OFTEN ALLEGED, PROVED DECIDEDLY HELPFUL IN THE MAJORITY OF CASES, and even in many instances to plants which were not particularly in need of liming."

In 1900 the Rhode Island Experiment Station concluded a series of experiments in the use of acid phosphate on limed and unlimed soils

with the following results: "In 1894 the limed land produced 395 pounds of corn to the acre, the unlimed 326. The limed land produced 315 pounds stover, the unlimed 255. From 1896-1899 the total hay produced on limed land was 2,021 pounds, and on the unlimed land 895 pounds. In 1900 the limed land produced 550 pounds of corn to the acre, the unlimed 496; in 1900 the corn stover produced on limed land was 666 pounds, on unlimed 592 pounds."

This Station, commenting on certain other fertilizer results, states: "Double superphosphates particularly, and, in some instances, dissolved bone black and acid phosphate, proved relatively inefficient on unlimed land, while basic slag has proved throughout to be a highly efficient phosphatic manure. Its relative efficiency has been particularly high where those plants have been grown which are helped by liming. This is doubtless due in part to the fact that it contains far more lime than bone meal or floats."

In E. S. R., Vol. 2, page 12, Dr. Kellner, in reporting the results of experiments in the use of lime in preserving the assimilability of phosphoric acid, states: "The results of these experiments prove plainly that in the top soil of the paddy field the presence of lime had an action **DECIDEDLY BENEFICIAL TO THE PRESERVATION OF THE ASSIMILABILITY OF THE PHOSPHORIC ACID APPLIED IN THE SOLUBLE FORM**, and that, under the conditions of the experiment, the maximum effect was obtained with from one to two and one-half per cent of lime in the air-dried soil. Where one per cent of lime was added there was nearly twice as much phosphoric acid soluble in ammonium citrate solution as where no lime was added; and it even appears that upon a longer action of the lime, after two months, some of the phosphorus **PREVIOUSLY PRECIPITATED IN A MORE INSOLUBLE FORM WAS RENDERED SOLUBLE IN CITRATE SOLUTION BY THE PRESENCE OF TWO AND ONE-HALF PER CENT OF LIME**. Dr. Kellner adds that "In the majority of cases, as in the sandy, clayey or ordinary loam soils of our paddy fields, a moderate percentage of lime applied previous to the application of superphosphate will certainly secure a good effect of its phosphoric acid on the crop, especially if the soils are ferruginous and will otherwise favor the formation of the less assimilable basic phosphates of iron and aluminum. For the same reasons, in every limed soil, superphosphates are sure to have a good effect."

Dr. G. A. Frapps, of the Texas Experiment Station, in Bulletin 178, states: "When nitrogen and potash are applied, the addition of carbonate of lime at the rate of one-half of one per cent, or five tons an acre, increased the size of the crop and the amount of phosphoric acid withdrawn from the soil phosphates on six soils tested in pot experiments. The effect of the lime was small at first, but usually increased with succeeding crops. With the six soils, which gave up phosphoric acid equal to from five to eighteen bushels of corn an acre per crop, the addition

of carbonate of lime caused an increase in the quantity of phosphoric acid taken up equal to from three to seven bushels an acre per crop.

"The presence of carbonate of lime or vegetable matter may bring about a difference in the quantity of phosphoric acid assimilated by the plants from soils containing equal quantities of active phosphoric acid. The addition of carbonate of lime or of vegetable matter had practically no effect upon the quantity of active phosphoric acid remaining in the soil at the end of the experiment. The phosphoric acid removed in the cropping also had practically no effect upon the quantity of phosphoric acid remaining in the soil at the end of the experiment. The active phosphoric acid in the soils used varied from fifteen to twenty-seven parts per million. The phosphoric acid taken up by the plants was evidently drawn from the more insoluble phosphates.

"Carbonate of lime caused a gain in phosphoric acid taken up. In all cases the gain ranged from 5 per cent on soil No. 895, with single application of lime, to nearly 95 per cent on soil 1145 with double application of lime. Except in two instances, the gains were considerable. **THE EFFECT OF LIME HAS BEEN TO DECIDEDLY INCREASE THE ASSIMILABILITY OF PHOSPHORIC ACID.**

"The phosphoric acid absorbed by the plants from the soils depends not only on the form of the phosphoric acid in the soil, but also on the presence of other substances such as carbonate of lime and organic matter. Soils 895 and 1145 are acid, but the carbonate of lime had no greater effect upon their phosphoric acid than on soils 892 and 893, which are not acid.

"It is, of course, impossible to state definitely whether the phosphoric acid was rendered more available, or whether the crops took up more phosphoric acid because the conditions were made more favorable by the addition. The effect, however, is the same, viz., **THROUGH THE ADDITION OF CARBONATE OF LIME TO THE SOIL THE PLANTS CONSUMED MORE PHOSPHORIC ACID.**"

THE SUBSTITUTION OF CALCIUM CARBONATE FOR POTASH IN FERTILIZER MIXTURES

Since the presence of lime carbonate in the soil seems to prevent the formation of the insoluble phosphates of iron and aluminum, the wisdom of mixing the soluble phosphates with calcium carbonate before placing them in soils heavily charged with iron and aluminum oxides becomes apparent.

As an average result of twelve years experimental tests with *reverted* bone black (soluble phosphate) the Pennsylvania Experiment Station obtained a higher yield of corn, oats, and wheat than from the acid phosphate applied to the soil in its normal condition. The acid phosphate in the bone black was caused to revert by mixing it with quick lime twelve hours before applying it to the soil.

In January, 1915, Dr. Charles E. Thorne, of the Ohio Experiment

Station, in an address before the Pennsylvania State Board of Agriculture at Harrisburg, was asked by a farmer whether there would be any injurious effect from mixing acid phosphate with limestone and wood ashes. Dr. Thorne replied: "No, no injurious effect to the acid phosphate. You should not mix nitrate of soda with it, but the phosphoric acid will not suffer any harm."

On February 29th of this year we asked Dr. Lucius L. Van Slyke, of the Geneva Experiment Station, New York, whether, in his opinion, detrimental results would follow mixing 600 pounds of ground limestone, 400 pounds of acid phosphate, and 200 pounds of cotton-seed meal, thus making a fertilizer mixture with ground limestone substituted for potash. To our inquiry, Dr. Van Slyke replied: "The mixture of 600 pounds of ground limestone, 400 pounds of acid phosphate, and 200 pounds of cotton-seed meal can be made without objection if the mixture is made within a few days previous to application to the soil." There is no higher authority on soil chemistry in the United States than Dr. Van Slyke.

In his discussion of the effects of carbonates of lime on the soil, Prof. J. S. Brogdon, of Atlanta, Ga., Secretary Chemical Industries, Georgia Chamber of Commerce, and of the Georgia Section of the A. C. S., agrees with Dr. Van Slyke in saying "when acid phosphate is applied to the soil, if there is a deficiency of carbonate of lime in the soil, the phosphoric acid will combine with the iron and aluminum of the soil to form the phosphates of iron and aluminum; but in soils containing any reasonable amount of lime, dicalcium phosphate will be formed. The former are of much lower solubility than the latter, consequently their phosphoric acid is much slower in reaching the plant. Applications of carbonate of lime are of great value on soils because they form DICALCIUM PHOSPHATES, and so increase the amount of phosphoric acid soluble in water.

"As has been previously mentioned, ground limestone has no tendency to absorb moisture from the atmosphere, while acid phosphate has a decided tendency in that direction, due to the fact that free phosphoric acid easily absorbs moisture from the atmosphere. Acid phosphate which analyzed 18 per cent in the pile, in one instance, proved to be strongly acid, and when reduced to 16 per cent by the use of ground limestone the most delicate chemical test failed to find the slightest trace of free acid, and on account of this there was a decided tendency for the acid phosphate to remain dry, even though it was exposed to damp atmosphere.

"A mixture of 80 per cent phosphate, 20 per cent ground limestone, covering some fifty analyses, may be summarized in saying that the amount of moisture remained unchanged, that the total phosphoric acid was not affected, whereas the water soluble was found to decrease and the citrate solubles found to increase the same amount, that being approximately 6 per cent, this change being due to the formation of

dicalcium phosphate. The insoluble was found to also increase about 34 per cent. When parallel tests were carried on with the same acid phosphate, using 20 per cent argillaceous (dirt) filler, THE SAME CHANGES IN THE WATER SOLUBLE AND CITRATE SOLUBLE WERE FOUND; but in this instance the COMPOUNDS FORMED WERE THE PHOSPHATES OF IRON AND ALUMINUM AND NOT THE DICALCIUM PHOSPHATE. THE LOSS IN INSOLUBLE WAS PRACTICALLY THREE TIMES AS GREAT.

"Ten bags of complete fertilizer, using 275 pounds of limestone, meal, tankage, and sulphate of ammonia were mixed and stored. At the end of seven months the bags in which these goods were stored were in as perfect condition as on the day on which they were stored. One thousand tons of complete fertilizer, using 110 pounds of ground limestone, fish, sulphate, and tankage were stored in bulk; another lot of complete fertilizer, using cotton-seed meal as an ammoniate, and 435 pounds of ground limestone was mixed and stored. After some months the three were analyzed, with the result that no apparent chemical change had occurred; in all three instances the mechanical condition of the fertilizer was found to be superior to that which the writer is accustomed to know where other fillers have been used.

"In conclusion, ground limestone has a most beneficial effect on the mechanical conditions and will change the water-soluble phosphoric acid into the very desirable dicalcium phosphate, and the results of the several experiment stations are that ground limestone will increase the crop yields enormously."

In 1914, Professor Brogdon carried out a number of experiments on a number of different kinds of soil to ascertain whether the presence of ground limestone in a mixed fertilizer containing acid phosphate would render the phosphoric acid more or less available for plant use. Professor Brogdon states: "From a number of experiments, the conclusion was drawn that if phosphoric acid, nitrogen, and limestone were used together as a fertilizer, larger crops could be grown than if phosphoric acid, nitrogen, and potash had been used."

"Desiring to ascertain results from this system of fertilization as applied to the cotton crop on various Georgia soils, a number of gentlemen having the reputation of being practical farmers and known to be interested in agricultural chemistry were asked to assist in this demonstration. Of the six men, living in six different counties widely separated, each one planted three patches of cotton. Of the six men three were planters who cultivate annually several thousand acres, and the other three were small planters selected for their ability to carry out these experiments accurately. Exactly the same size patch was cultivated in each instance, the method of cultivation being left to the experimenter. In all of the experiments the seed used were furnished by the courtesy of A. C. Lewis of the office of the State Entomologist, using

hybrid No. 63. The fertilizers used were made under the direction of the writer by the courtesy of the Porter Fertilizer Company. None of the experimenters were advised as to the kind of fertilizer with which they were supplied; neither have they since been advised as to the results obtained by any of the experimenters.

"Level ground was selected for each experiment, exactly the same sized patch was cultivated in every experiment, and exactly the same amount of fertilizer was used on every patch. Elaborate precautions were taken to secure accuracy. The writer weighed out each bag of fertilizer, which was numbered, and numbered stakes were placed in each bag to be driven in the rows. At harvest time numbered sacks were sent to each experimenter as receptacles for the seed cotton. All of the seed cotton was carefully air-dried before weighing. Half of the nitrogen in all the fertilizers used was derived from nitrate. Exactly the same amount of phosphoric acid and nitrogen was used on every patch. On patches No. 1 and No. 2 abundant amounts of potash were used at the rates of 200 pounds of $12\frac{1}{2}$ per cent kainit per acre, which is 40 pounds more of kainit than when 1,000 pounds of 10-2-2 guano is used per acre. On patch No. 3 no potash was used, but this guano was mixed with finely ground limestone so that the limestone used would be applied at the rate of 1,600 pounds per acre.

"These bags of acid phosphate mixed with meal and nitrate of soda and large quantities of finely ground limestone were allowed to stand several weeks before the fertilizer was used on patch No. 3.

"The average of these results shows that the six men in six comities on six different soils harvested 16 PER CENT MORE SEED COTTON ON PATCH No. 3, WHERE NO POTASH WAS USED, BUT WHERE LIBERAL APPLICATIONS OF FINELY GROUND LIMESTONE WERE MADE, THAN ON PATCHES No. 1 AND No. 2, WHERE POTASH WAS USED.

"Summarizing these experiments, the writer advocates that on Georgia soils liberal amounts of guano containing 10 per cent phosphoric acid, 2 per cent ammonia, together with not less than 1,600 pounds of very finely divided limestone, will bring excellent results in the cultivation of cotton.

"The value of builder's lime as a soil amendment is recognized, but emphasis must be placed upon the fact that BUILDER'S LIME IS INJURIOUS TO FERTILIZERS, whereas limestone can be mixed with fertilizer in any quantity without in any way rendering the fertilizer less valuable, as was shown by these experiments."

Some laboratory experiments by Brackett and Freeman of South Carolina have been cited in opposition to the conclusions drawn from the above data; but Mr. Brackett himself admits his were mere laboratory experiments and were not carried out under field conditions. They can, therefore, have little or no bearing on the very important question under discussion, namely, WHETHER IT WOULD BE WISE TO

MIX GROUND LIMESTONE WITH ACID PHOSPHATE IMMEDIATELY BEFORE APPLYING IT TO THE SOIL FOR THE DOUBLE PURPOSE OF SUBSTITUTING THE GROUND LIMESTONE FOR POTASH IN THE FERTILIZER MIXTURE, AND FOR PREVENTING THE IMMEDIATE FORMATION OF THE INSOLUBLE PHOSPHATES OF IRON AND ALUMINUM.

No doubt other experiments could be cited that would seem to prove the opposite of the conclusions justified from the above data, but the facts and conclusions incorporated in the foregoing discussion are vouched for by the most eminent authorities in the entire field of agricultural research and are in complete harmony with careful observation, practical farm experience, and carefully planned and wisely interpreted field experiments, as well as in accord with ordinary common sense and reason. THEY ARE, MOREOVER, IN ACCORD WITH THE FARMER'S BEST INTERESTS AT THIS TIME, AS A MEANS BY WHICH HE MAY REDUCE THE EXORBITANTLY HIGH PRICE OF HIS FERTILIZERS.

No attempt has been made to leave the impression that acid phosphate mixed with ground limestone will not revert to what is called di-calcium and, to some extent, to tri-calcium forms. But these forms of phosphorus are STILL AVAILABLE TO THE CROPS, WHILE THE IRON AND ALUMINUM PHOSPHATES ARE ENTIRELY OUT OF REACH OF THE PLANTS.

All agree that ordinary acid phosphate will slowly revert to the relatively insoluble forms even while stored in bags and unmixed with anything, but on being applied to and mixed with the soil will revert to the entirely insoluble forms of iron and aluminum phosphates with great rapidity. The farmer thus loses much of his phosphatic manures which, IF THEY HAD BEEN MIXED WITH CALCIUM CARBONATE AT FIRST AND APPLIED TO THE SOIL IN THIS MIXED CONDITION, would have remained in a condition available to the crop through the gradual solution of the di- and tri-calcium phosphates by the various acids found in the ordinary soil solutions. THEREFORE, SINCE ACID PHOSPHATE, WHEN APPLIED TO ORDINARY NORTH CAROLINA SOILS, IF NOT IMMEDIATELY TAKEN UP BY THE PLANTS, ALWAYS REVERTS, WITHIN A VERY SHORT TIME, TO THE MORE OR LESS INSOLUBLE FORMS, IT IS OF THE FIRST IMPORTANCE TO THE FARMER THAT IT BE PERMITTED TO CHANGE INTO FORMS FROM WHICH SUCCEEDING CROPS CAN SECURE IT WITH RELATIVE EASE.

From the evidence at hand, we feel justified in offering the farmers of North Carolina the following fertilizer formulas containing calcium carbonate as a substitute for potash. The practice of using limestone to liberate inert soil potash is too well established for serious discussion at this time. These and similar formulas are not entirely new, but have been used for some time with the best of results; and the farmer's own

good judgment will convince him that no harm, but much good, may come from their use. These formulas should be given at least a fair trial. If found satisfactory under our varying local conditions, as we think they will, much will be saved on future fertilizer bills, as the limestone is cheap and many farmers have their own cotton-seed meal.

In all cases, if practicable to do so, we recommend the use of at least one ton of calcium carbonate broadcast to the acre before using these mixed fertilizers in the drill. The acre applications of these mixtures will depend on the varying fertility of the soils, but from 600 to 1,000 pounds to the acre will likely be about an average application in most parts of North Carolina.

Ground limestone can at this time (1916) be laid down at Raleigh in bulk at \$2.60 a ton. The normal price for 16 per cent acid phosphate is not over \$15 a ton. The average price of cotton-seed meal is not over \$30, and nitrate of soda does not generally sell for more than \$60 a ton. Basing our calculations on these prices, the cost per ton of the different formulas given below has been worked out and attached. Of course, the whole of this discussion presupposes home mixing of the fertilizer ingredients.

A New Fertilizer Formula for Small Grain

- 1,200 pounds of ground limestone or marl,
 - 600 pounds of 16 per cent acid phosphate, and
 - 200 pounds of cotton-seed meal or fish scrap.
- Cost, about \$9.06 a ton.

New Fertilizer Formula for Cotton and Corn

- 1,000 pounds of ground limestone or marl,
 - 600 pounds of 16 per cent acid phosphate, and
 - 400 pounds of cotton-seed meal or some other ammoniated goods carrying an equal amount of nitrogen.
- Cost, about \$11.80 a ton.

New Fertilizer Formula for Tobacco

- 1,200 pounds of ground limestone or marl,
- 400 pounds of 16 per cent acid phosphate,
- 350 pounds of cotton-seed meal, and
- 50 pounds of nitrate of soda.

Any other material carrying an equal amount of nitrogen may be substituted for the cotton-seed meal, such as dried blood, fish scrap, and so on. Cost, about \$9.21 a ton.

New Fertilizer Formula for Peanuts

- 1,200 pounds of ground limestone or marl,
- 650 pounds of 16 per cent acid phosphate,
- 100 pounds of cotton-seed meal, and
- 50 pounds of nitrate of soda.

The cotton-seed meal may be replaced by any other material carrying an equal amount of available nitrogen. Cost, about \$9.43 a ton.

New Fertilizer Formula for Sweet Potatoes

1,000 pounds of ground limestone or marl,
500 pounds of 16 per cent acid phosphate, and
500 pounds of cotton-seed meal.

Any other material carrying an equal amount of nitrogen may be substituted for the cotton-seed meal, such as dried blood, fish scrap, and so on. Cost, about \$12.55 a ton.

New Fertilizer Formula for Sweet Potatoes

600 pounds of ground limestone or marl,
500 pounds of 16 per cent acid phosphate, and
700 pounds of cotton-seed meal, and
200 pounds of nitrate of soda.

Any other material carrying an equal amount of available nitrogen may be substituted for the cotton-seed meal, such as dried blood, fish scrap, and so on. Cost, about \$21.03 a ton.

THE BULLETIN

OF THE

NORTH CAROLINA

DEPARTMENT OF AGRICULTURE

RALEIGH

Vol. 37, No. 6

JUNE, 1916

Whole No. 221

ANALYSES OF FERTILIZERS { FALL SEASON, 1915.
SPRING SEASON, 1916.

PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Postoffice at Raleigh, N. C., as second class matter,
February 7, 1901, under Act of June 6, 1900.

EDWARDS & BROUGHTON PRINTING CO.
STATE PRINTERS

STATE BOARD OF AGRICULTURE

W. A. GRAHAM, Commissioner, *ex officio* Chairman, Raleigh.

F. P. LATHAM.....	Belhaven.....	First District.
C. W. MITCHELL.....	Aulander.....	Second District.
R. L. WOODARD.....	Pamlico.....	Third District.
CLARENCE POE.....	Raleigh.....	Fourth District.
R. W. SCOTT.....	Haw River.....	Fifth District.
A. T. McCALLUM.....	Red Springs.....	Sixth District.
C. C. WRIGHT.....	Hunting Creek.....	Seventh District.
WILLIAM BLISSOE.....	Gale.....	Eighth District.
W. J. SHUFORD.....	Hickory.....	Ninth District.
A. CANNON.....	Horse Shoe.....	Tenth District.

OFFICERS AND STAFF

W. A. GRAHAM.....	Commissioner.
K. W. BARNES.....	Secretary and Purchasing Agent.
MISS SARAH D. JONES.....	Bookkeeper.
D. G. COXN.....	Bulletin Superintendent.
B. W. KILGORE.....	State Chemist, Director Test Farms.
J. M. PICKEL.....	Feed Chemist.
W. G. HAYWOOD.....	Fertilizer Chemist.
J. Q. JACKSON.....	Assistant Chemist.
E. S. DEWAR.....	Assistant Chemist.
E. B. HART.....	Assistant Chemist.
D. M. McCARTY.....	Assistant Chemist.
F. C. WIGGINS.....	Assistant Chemist.
J. F. HATCH.....	Fertilizer Clerk.
R. W. COLLETT.....	Assistant Director Test Farms.
H. H. BRIMLEY.....	Curator of Museum.
T. W. ADICKES.....	Assistant Curator.
FRANKLIN SHERMAN, JR.....	Entomologist.
R. W. LEIBY.....	Assistant Entomologist.
S. C. CLAPP.....	Assistant Entomologist in Field Work.
B. B. FLOWE.....	Veterinarian.
H. P. FLOWE.....	Assistant Veterinarian.
W. N. HUTT.....	Horticulturist.
R. G. HILL.....	Assistant Horticulturist.
B. SZYMONAIA.....	Demonstrator Fruit and Truck Crops.
C. D. MATTHEWS.....	Assistant Horticulturist.
T. B. PARKER.....	Director of Farmers' Institutes.
W. M. ALLEN.....	Chemist and Chief, Division Food and Oil Inspection.
E. W. THORNTON.....	Assistant Chemist, Division Food and Oil Inspection.
C. E. BELL.....	Assistant Chemist, Division Food and Oil Inspection.
LELAND B. RHODES.....	Assistant Chemist, Division Food and Oil Inspection.
C. B. WILLIAMS.....	Chief, Division of Agronomy.
J. K. PLUMMER.....	Soil Chemist.
W. F. PATE.....	Agronomist in Soils.
R. Y. WINTERS.....	Plant Breeding.
*W. E. HEARN.....	State Soil Agent, Soil Survey.
L. L. BRINKLEY.....	Soil Survey.
H. D. LAMBERT.....	Soil Survey.
S. O. PERKINS.....	Soil Survey.
J. L. BURGESS.....	Agronomist and Botanist.
C. H. WALDRON.....	Assistant Agronomist and Botanist.
MISS LOUISE A. RADEMACHER.....	Assistant to Botanist.
MISS ALMA STONE.....	Assistant to Botanist.
DAN T. GRAY.....	Chief in Animal Industry.
R. S. CURTIS.....	Associate in Animal Industry.
W. H. EATON.....	Dairy Experimentor.
†ALVIN J. REED.....	Dairy Farming.
STANLEY COMBES.....	Assistant in Dairy Farming.
†J. A. AREY.....	Assistant in Dairy Farming.
F. R. FAIRHAM.....	Assistant in Dairy Farming.
F. T. PEDEN.....	Beef Cattle.
EARL HOSTETLER.....	Assistant in Beef Cattle and Swine.
†A. L. JERDAN.....	Beef Cattle.
†L. E. CASE.....	Assistant in Beef Cattle.
†B. P. FOLK.....	Pig Clubs.
†A. G. OLIVER.....	Poultry Clubs.
†E. H. MATHEWSON.....	Tobacco Investigations.
†C. R. HUDSON.....	Farm Demonstration Work.
†T. E. BROWNE.....	Assistant in Charge of Boys' Clubs.
†A. K. ROBERTSON.....	Assistant in Boys' Clubs.
†MRS. JANE S. MCKIMMON.....	Assistant in Charge Girls' Clubs.
MISS M. L. JAMISON.....	Assistant in Home Economics.

C. E. CLARK, Assistant Director Edgecombe Test Farm, Rocky Mount, N. C.

F. T. MEACHAM, Assistant Director Iredell Test Farm, Statesville, N. C.

JOHN H. JEFFERIES, Assistant Director Pender Test Farm, Willard, N. C.

S. F. DAVIDSON, Assistant Director Buncombe Test Farm, Swannanoa, N. C.

E. G. MOSE, Assistant Director Granville Test Farm, Oxford, N. C.

J. E. DAVIDSON, Assistant Director Transylvania Test Farm, Blantyre, N. C.

*Assigned by the Bureau of Soils, United States Department of Agriculture.

†Assigned by the Bureau of Animal Husbandry, United States Department of Agriculture.

‡In cooperation with Bureau of Plant Industry, United States Department of Agriculture.

LETTER OF TRANSMITTAL

HON. W. A. GRAHAM,

Commissioner of Agriculture.

SIR:—I submit herewith analyses of fertilizers made in the laboratory of samples collected during the past fall and spring. These analyses show fertilizers and meals to be about as heretofore, and to be, generally, what was claimed for them. I recommend that it be issued as the June BULLETIN.

Very respectfully,

B. W. KILGORE,

State Chemist.

Approved for printing:

W. A. GRAHAM,

Commissioner.

ANALYSES OF FERTILIZERS

FALL SEASON, 1915; SPRING SEASON, 1916

BY B. W. KILGORE.

W. G. HAYWOOD, J. Q. JACKSON, E. S. DEWAR, E. B. HART AND F. C. WIGGINS.

The analyses presented in this BULLETIN are of samples collected by the fertilizer inspectors of the Department, under the direction of the Commissioner of Agriculture, during fall months of 1915 and the spring months of 1916. They should receive the careful study of every farmer in the State who uses fertilizers, as by comparing the analyses in the BULLETIN with the claims made for the fertilizers actually used, the farmer can know by or before the time fertilizers are put in the ground whether or not they contain the fertilizing constituents in the amounts they were claimed to be present.

TERMS USED IN ANALYSES

Water-soluble Phosphoric Acid.—Phosphate rock, as dug from the mines, mainly in South Carolina, Florida, and Tennessee, is the chief source of phosphoric acid in fertilizers.

In its raw, or natural, state the phosphate has three parts of lime united to the phosphoric acid (called by chemists tricalcium phosphate). This is very insoluble in water and is not in condition to be taken up readily by plants. In order to render it soluble in water and fit for plant food, the rock is finely ground and treated with sulphuric acid, which acts upon it in such a way as to take from the three-lime phosphate two parts of its lime, thus leaving only one part of the lime united to the phosphoric acid. This one-lime phosphate is what is known as water-soluble phosphoric acid.

Reverted Phosphoric Acid.—On long standing some of this water-soluble phosphoric acid has a tendency to take lime from other substances in contact with it, and to become somewhat less soluble. This latter is known as reverted or gone-back phosphoric acid. This is thought to contain two parts of lime in combination with the phosphoric acid, and is thus an intermediate product between water-soluble and the original rock.

Water-soluble phosphoric acid is considered somewhat more valuable than reverted, because it becomes better distributed in the soil as a consequence of its solubility in water.

Available Phosphoric Acid is made up of the water-soluble and reverted; it is the sum of these two.

Water-soluble Ammonia.—The main materials furnishing ammonia in fertilizers are nitrate of soda, sulphate of ammonia, cotton-seed meal, dried blood, tankage, and fish scrap. The first two of these (nitrate of soda and sulphate of ammonia) are easily soluble in water and become well distributed in the soil where plant roots can get at them. They are, especially the nitrate of soda, ready to be taken up by plants, and are therefore quick-acting forms of ammonia. It is mainly the ammonia from nitrate of soda and sulphate of ammonia that will be designated under the heading of water-soluble ammonia.

Organic Ammonia.—The ammonia in cotton-seed meal, dried blood, tankage, fish scrap, and so on, is included under this heading. These materials are insoluble in water, and before they can feed plants they must decay and have their ammonia changed, by the aid of the bacteria of the soil, to nitrates, similar to nitrate of soda.

They are valuable then as plant food in proportion to their content of ammonia, and the rapidity with which they decay in the soil, or rather the rate of decay, will determine the quickness of their action as fertilizers. With short season, quick-growing crops, quickness of action is an important consideration, but with crops occupying the land during the greater portion, or all, of the growing season, it is better to have a fertilizer that will become available more slowly, so as to feed the plant till maturity. Cotton-seed meal and dried blood decompose fairly rapidly, but will last the greater portion, if not all, of the growing season in this State. While cotton seed and tankage will last longer than meal and blood, none of these act so quickly, or give out so soon, as nitrate of soda and sulphate of ammonia.

Total ammonia is made up of the water-soluble and organic; it is the sum of these two.

The farmer should suit, as far as possible, the kind of ammonia to his different crops, and a study of the forms of ammonia as given in the tables of analyses will help him to do this.

AVAILABILITY OF NITROGEN

During the past few years the increasing cost and the extensive use for other purposes of the standard high grade ammoniates have caused the appearance upon the market of many new nitrogenous materials which are being used as sources of nitrogen in commercial fertilizers. These materials are, to a large extent, trade-waste products, in themselves not permissible as sources of nitrogen, but which after treatment in various ways develop a considerable degree of availability, and in many cases the nitrogen contained therein becomes very largely water-soluble.

On account of the extensive use of these new ammoniates this department is now making in its laboratory by chemical methods determinations of the availability of the water-insoluble organic nitrogen in the samples of fertilizers taken for analysis. In this way we are largely able

to differentiate between the good and the bad ammoniates and to distinguish those forms which are readily available from those more difficultly so.

FORM OF POTASH IN TOBACCO FERTILIZERS

Tobacco growers are becoming yearly more disposed to know the form of potash, whether from kainit, muriate, or sulphate, which enters into their tobacco fertilizers. Considerable work of this kind has been done for individuals, and we now determine the form of potash in all tobacco brands, for the benefit of tobacco growers.

The term potash from muriate, as reported in the analyses, does not mean, necessarily, that the potash was supplied by muriate of potash. Sulphate or some other potash salt may have been used, but in all fertilizers where the term potash from muriate is used, there is enough chlorine present to combine with all the potash, though it may have come from salt in tankage, kainit, or karnalite. As the objection to the use of muriate of potash in tobacco fertilizers arises from the chlorine present, it does not matter whether this substance is present in common salt or potash-furnishing materials.

The use of sulphate of potash where there is chlorine present in the other ingredients of the fertilizer will not present the injurious effect of the chlorine. The term potash from muriate in our analyses, therefore, means that there is sufficient chlorine present in the fertilizer from all sources to combine with the potash to the extent indicated by the analyses.

VALUATIONS

To have a basis for comparing the values of different fertilizer materials and fertilizers, it is necessary to assign prices to the three valuable constituents of fertilizers—ammonia, phosphoric acid, and potash. These figures, expressing relative value per ton, are not intended to represent crop-producing power, or agricultural value, but are estimates of the commercial value of ammonia, phosphoric acid and potash in the materials supplying them. These values are only approximate, as the cost of fertilizing materials is liable to change, as other commercial products are, but they are believed to fairly represent the cost of making and putting fertilizers on the market. They are based on a careful examination of trade conditions, wholesale and retail, and upon quotations of manufacture.

Relative value per ton, or the figures showing this, represent the prices on board the cars at the factory, in retail lots of five tons or less, for cash.

To make a complete fertilizer the factories have to mix together in proper proportions materials containing ammonia, phosphoric acid, and potash. This costs something. For this reason it is thought well to have two sets of valuations—one for the raw or unmixed materials, such as acid phosphate, kainit, cotton-seed meal, etc., and one for mixed fertilizers.

VALUATIONS FOR 1915

In Unmixed or Raw Materials

For phosphoric acid in acid phosphate	4	cents per pound
For phosphoric acid in bone meal and Peruvian Guano..	3 ¹ / ₂	cents per pound
For nitrogen	19	cents per pound
For potash	8	cents per pound

In Mixed Fertilizers

For phosphoric acid	4 ¹ / ₂	cents per pound
For nitrogen	20	cents per pound
For potash	8 ¹ / ₂	cents per pound

VALUATIONS FOR 1916

In Unmixed or Raw Materials

For phosphoric acid in acid phosphate	4 ¹ / ₂	cents per pound
For phosphoric acid in bone meal and Peruvian Guano..	4	cents per pound
For nitrogen	20	cents per pound

In Mixed Fertilizers

For phosphoric acid	5	cents per pound
For nitrogen	21	cents per pound
For potash	25	cents per pound

HOW RELATIVE VALUE IS CALCULATED

In the calculation of relative value it is only necessary to remember that so many per cent means the same number of pounds per hundred, and that there are twenty hundred pounds in one ton (2,000 pounds).

With an 8-2-1.65 goods, which means that the fertilizer contains available phosphoric acid 8 per cent, potash 2 per cent, and nitrogen 1.65 per cent, the calculation is made as follows:

<i>Percentage or Lbs. in 100 Lbs.</i>	<i>Value per 100 Lbs.</i>	<i>Value per Ton, 2,000 Lbs.</i>
8 pounds available phosphoric acid at 5 cents..	0.40 × 20	\$ 8.00
1.65 pounds nitrogen at 21 cents	0.3465 × 20	6.93
2 pounds potash at 25 cents	0.50 × 20	10.00
Total value	1.2465 × 20	\$24.93

Freight and merchant's commission must be added to these prices.

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1915. MIXED FERTILIZERS.

Laboratory Number.	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition of Parts per 100					Relative Value per Ton at Factory
				Available Phosphate	Water-Soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	
Brands claiming -----									
6122	American Fertilizer Co., Norfolk, Va.	Bone and Peruvian Guano	Wadeboro	8.00	1.65	2.00	2.00	2.00	\$ 17.20
6181	Armour Fertilizer Works, Greensboro, N. C.	Armour's Slaughter House Fertilizer	Norwood	8.66	.98	.61	1.59	1.93	1.66
6172	Baugh & Sons Co., Norfolk, Va.	Baugh's Animal Bas. Compound	Asheboro	8.13	.80	.85	1.65	2.00	1.97
6121	Georgia Chemical Co., Augusta, Ga.	Georgia Formula	Bennett	7.86	.70	.99	1.69	2.05	1.90
6145	Navassa Guano Co., Wilmington, N. C.	Navassa Cotton-seed Meal Guano	Mount Tabor	10.71	2.06	.29	2.35	2.86	1.25
6155	do	Navassa Grain Fertilizer	Millboro	8.66	.56	.93	1.49	1.81	1.20
6219	Patapasco Guano Co., Baltimore, Md.	Saguall Ammoniated Guano	Granite Quarry	9.01	1.20	.41	1.61	1.96	1.82
6220	Palmetto Guano Corporation, Columbia, S. C.	Palmetto Special Fertilizer	Morven	8.22	.84	.53	1.57	1.91	1.94
6120	Pamlico Chemical Co., Washington, N. C.	Pamlico Bone and Fish Guano for Wheat	Oakboro	8.11	.92	.79	1.71	2.08	1.96
6196	Royster, F. S., Guano Co., Norfolk, Va.	Farmers' Bone Fertilizer	Roxboro	7.86	.92	.47	1.59	1.93	2.00
6154	do	do	Julian	8.16	.94	.57	1.57	1.91	1.72
6217	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Red Steer Guano	Richfield	7.24	.52	1.09	1.61	1.96	2.16
6119	Union Guano Co., Winston-Salem, N. C.	Fish Brand Ammoniated Guano	Bennett	8.05	1.22	.51	1.73	2.19	2.02
6131	do	Old Homesty Guano	Morven	9.35	1.16	.53	1.69	2.05	1.16
6111	Vac-Car. Chemical Co., Richmond, Va.	A. & V.'s Old Homesty Guano	Mount Tabor	8.71	1.18	.53	1.71	2.08	2.06
6198	do	Durham Fertilizer Co.'s Genuine Bone and Peruvian Guano	Rougemont	8.06	1.24	.45	1.69	2.05	1.96

ANALYSES OF COMMERCIAL FERTILIZERS *Continued.*
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100						Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	
Brands claiming										
6199	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Progressive Farmer Guano.	Oxford.	8.26	1.40	.45	1.85	2.25	2.00	18.23
6191	do.	Old Dominion Soluble Guano	Denton.	8.27	1.32	.51	1.83	2.22	1.87	17.94
6197	do.	do.	Henderson	8.36	1.12	.43	1.55	1.88	1.94	17.02
6194	do.	Southern Chemical Co.'s Electric Standard Guano.	Benson.	8.57	2.36	.25	2.61	3.17	1.46	20.63
6140	do.	V. C. C. Co.'s Farmers' Favorite C. S. M.	Mount Tabor	9.37	.54	1.15	1.69	2.05	1.42	17.61
Brand claiming										
6150	Armour Fertilizer Works, Wilmington, N. C.	Armour's Carolina Cotton Special Fertilizer.	Clarkton.	8.00	1.10	.37	1.47	1.79	2.72	16.97
Brands claiming										
6144	Navassa Guano Co., Wilmington, N. C.	Navassa Special 3 Per Cent Guano.	Chadbourn.	7.85	1.08	.93	2.01	2.41	1.92	18.37
6340	Pearsall & Co., Wilmington, N. C.	Pearsall's Use Me H. G. Guano.	Kerr.	6.80	.72	1.23	1.95	2.37	1.76	16.91
6143	Va.-Car. Chemical Co., Richmond, Va.	Charlotte Oil and Fertilizer Co.'s Special 3 Per Cent Guano, C. S. M.	Rowland.	8.40	1.22	1.13	2.35	2.86	1.84	20.09
6142	do.	Powers, Gibbs & Co.'s Cotton Belt Ammoniated Guano.	Rowland.	9.25	2.34	.33	2.67	3.25	2.00	22.40
6193	do.	do.	Benson.	8.72	2.02	.39	2.41	2.93	1.94	20.79
Brands claiming										
6234	Pamlico Chemical Co., Washington, N. C.	Tobacco Growers' Friend Guano	Grimesland.	8.00	1.04	1.29	2.33	2.83	3.00	22.18
6335	Royster, F. S., Guano Co., Norfolk, Va.	Bonanza Tobacco Guano.	Grimesland.	8.35	.68	1.51	2.19	2.66	3.10	21.54

Brands claiming.....											9.00		.82	1.00	2.00	14.78
6156	Navassa Guano Co., Wilmington, N. C.	Navassa Wheat Fertilizer.....	Siler City.....	9.53	1.16	.41	1.57	1.91	1.20	16.90						
6195	Patapasco Guano Co., Baltimore, Md.	Coon Brand Guano.....	Roxboro.....	9.69	.64	.39	1.03	1.25	2.08	15.84						
6168	Rasin-Monumental Co., Baltimore, Md.	Baltimore Special Mixture.....	Porters.....	11.73	.36	.37	.73	.89	1.49	16.01						
6169	Royster, F. S., Guano Co., Norfolk, Va.	Bison Special Fertilizer.....	Seagrove.....	9.74	.42	.43	.85	1.03	1.60	14.89						
6216	Union Guano Co., Winston, N. C.	Carolina Grain Grower.....	Albemarle.....	10.38	.26	.57	.83	1.91	1.41	15.06						
Brand claiming.....											9.00		.82	1.00	3.00	16.64
6133	Patapasco Guano Co., Baltimore, Md.	Coon Brand Guano.....	Marshville.....	9.14	.90	.35	1.25	1.52	3.01	18.39						
Brands claiming.....											9.00		1.65	2.00	1.00	16.40
6171	Brown, H. P., Guano Co., Salisbury, N. C.	Brown's Guano.....	Albemarle.....	11.08	.66	.57	1.23	1.59	1.18	16.90						
6167	Va.-Car. Chemical Co., Richmond, Va.	A. & A.'s Star Brand Guano.....	Seagrove.....	9.85	.78	.29	1.07	1.30	.82	14.54						
Brand claiming.....											9.00		2.38	2.89	2.00	21.02
6149	American Agricultural Chemical Co., Charleston, S. C.	Sea Fowl Guano.....	Johns.....	9.22	1.22	1.27	2.49	3.01	1.98	21.62						
Brands claiming.....											10.00		.82	1.00	1.00	13.98
6170	Brown, H. P., Guano Co., Salisbury, N. C.	Brown's 10-1-1 Guano.....	Albemarle.....	10.88	.30	.77	1.07	1.30	1.41	16.52						
6218	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Hoe Cake Fertilizer.....	Rockwell.....	10.48	.48	.39	.87	1.06	.96	14.54						
6132	Swift & Co.'s Fertilizer Works, Atlanta, Ga.	Swift's Plow Boy.....	Iron Station.....	10.55	.26	.73	.99	1.29	.88	14.95						
Brand claiming.....											10.00		1.65	2.00	1.00	17.30
6139	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Durham Grain Application.....	Mount Tabor.....	10.10	.62	.93	1.55	1.88	1.18	17.30						
Brand claiming.....											10.00		1.03	1.25		13.12
6151	Baugh & Sons Co., Norfolk, Va.	Baugh's Ammoniated Superphosphate.....	Gulf.....	14.10	.36	.41	.77	1.01		15.77						
Brands claiming.....											10.00		1.65	2.00		15.60
6123	Armour Fertilizer Works, Greensboro, N. C.	Armour's Ammoniated Compound Fertilizer.....	Matthews.....	10.03	.68	.91	1.59	1.93		15.39						
6157	Tennessee Chemical Co., Greensboro, N. C.	Ammoniated Compound.....	Julian.....	10.00	.68	.91	1.59	1.93		15.36						
Brand claiming.....											10.50				1.50	12.00
6190	Union Guano Co., Norfolk, Va.	Liberty Bell Crop Grower.....	Denton.....	11.43					1.54	13.32						

ANALYSES OF COMMERCIAL FERTILIZERS *Continued.*
MINED FERTILIZERS.

Laboratory Number.	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition of Parts per 100					Total Potash	Relative Value per Ton at Factory
				Available Phosphate	Water-soluble Nitrogen	Organic Nitrogen	Equivalent to Ammonia			
Brands claiming										
6129	American Agricultural Chemical Co., New York, N. Y.	Zell's Bone and Potash	Stanfield	10.00				2.00	\$ 12.40	
6128	American Fertilizer Co., Norfolk, Va.	Dissolved Bone and Potash for Corn and Wheat.	Monroe	10.38				1.40	11.72	
6180	Armour Fertilizer Works, Greensboro, N. C.	Armour's Phosphate and Potash Fertilizers	Norwood	11.34				1.22	12.28	
6127	Berkley Chemical Co., Norfolk, Va.	Laurel Mixture	Kings	9.77				1.66	11.61	
6174	Imperial Co., Norfolk, Va.	Imperial Bone and Potash	Mount Gilthead	10.70				1.62	12.38	
6125	Navassa Guano Co., Wilmington, N. C.	Dissolved Bone with Potash	Oakboro.	10.21				1.82	12.23	
6126	Norfolk Fertilizer Co., Norfolk, Va.	Oriana Bone and Potash	Oakboro.	11.20				1.58	12.77	
6186	Ober, G., & Sons Co., Baltimore, Md.	Other's Dissolved Bone Phosphate and Potash	Denton	10.39				1.76	12.34	
6124	Pamlico Chemical Co., Washington, N. C.	Pamlico Bone and Potash	Oakboro.	11.26				1.83	13.24	
6139	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Bone and Potash Mixture	Marshville	12.51				1.30	13.47	
6158	Va.-Car. Chemical Co., Richmond, Va.	A. & A.'s McGavock's Special Potash Mixture	Julian	10.13				1.50	11.67	
6200	.....do.....	Durham Fertilizer Co.'s Standard Wheat Grover.	Oxford	10.82				1.66	12.56	
6173	.....do.....	Southern Chemical Co.'s Mammoth Wheat and Grass Grover.	Seagrove	11.32				1.20	12.23	
6146	.....do.....	V.-C. C. Co.'s Dissolved Bone and Potash.	Rowland	10.24				1.80	12.28	
				11.88				2.06	14.19	
Brand claiming										
6134	Armour Fertilizer Works, Greensboro, N. C.	Armour's Phosphate and Potash	Abenarle	11.00				1.00	11.60	
				9.41				.76	9.76	

Brand claiming		12.00	2.00	14.20
6201	Royster, F. S., Guano Co., Norfolk, Va.....	Royster's Bone and Potash Mixture.....	Roxboro.....	14.26
RAW OR UNMINED FERTILIZER MATERIALS.				
Brand claiming		13.00	\$	10.40
6183	American Fertilizing Co., Norfolk, Va.....	Eagle Brand Acid Phosphate.....	Cid.....	12.36
Brands claiming		14.00		11.20
6138	American Fertilizing Co., Norfolk, Va.....	High Grade Acid Phosphate.....	Wadesboro.....	12.27
6102	Royster, F. S., Guano Co., Norfolk, Va.....	Royster's 14 Per Cent Acid Phosphate.....	Ore Hill.....	13.17
6137	Union Guano Co., Winston, N. C.....	Union 14 Per Cent Acid Phosphate.....	Wadesboro.....	12.47
Brands claiming		16.00		12.80
6205	American Agricultural Chemical Co., New York, N. Y.....	Derrick's 16 Per Cent Acid Phosphate.....	Rockwell.....	12.54
6182	American Fertilizing Co., Norfolk, Va.....	American High Grade Acid Phosphate.....	Cid.....	12.96
6387	Armour Fertilizer Works, Greensboro, N. C.....	Armour's 16 Per Cent Acid Phosphate.....	Sumacand.....	14.39
6166	do.....	do.....	Marshville.....	12.86
6184	Baugh & Sons Co., Philadelphia, Pa.....	Baugh's 16 Per Cent Acid Phosphate.....	Cid.....	12.54
6206	Brown, H. P., Guano Co., Salisbury, N. C.....	Brown's 16 Per Cent Acid Phosphate.....	Granite Quarry.....	13.71
6165	Bryant Fertilizer Co., Alexandria, Va.....	Bryant's Acid Phosphate.....	Siler City.....	12.86
6204	Caraligh Phosphate and Fertilizer Works, Raleigh, N. C.....	16 Per Cent Acid Phosphate.....	Warrenton.....	11.13
6215	do.....	do.....	Granite Quarry.....	13.60
6214	Carolina Union Fertilizer Co., Norfolk, Va.....	Carolina Union 16 Per Cent.....	Albemarle.....	13.08
6164	Cooperative Warehouse Co., Salisbury, N. C.....	Farmers' Union 16 Per Cent Acid Phosphate.....	Siler City.....	12.90
6213	Cotton States Fertilizer Works, Wilmington, N. C.....	Cotton States Acid Phosphates, High Grade.....	Richfield.....	13.42
6153	Craven Chemical Co., New Bern, N. C.....	Panama 16 Per Cent Acid Phosphate.....	Sanford.....	13.58
6211	Farmers' Union Warehouse Co., Statesville, N. C.....	Farmers' Union 16 Per Cent Acid Phosphate.....	Rockwell.....	13.16
6179	Georgia Chemical Works, Augusta, Ga.....	High Grade Bone Phosphate.....	Ashboro.....	14.55

ANALYSES OF COMMERCIAL FERTILIZERS—Continued. RAW OR UNMIXED FERTILIZER MATERIALS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphate	Water- soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	
Brands claiming									
6178	Imperial Company, Norfolk, Va.	High Grade Tennessee Acid Phosphate.	Mount Gillead.	15.05					12.04
6210	Navassa Guano Co., Wilmington, N. C.	Navassa 16 Per Cent Acid Phosphate.	Rockwell.	17.17					13.74
6212	N. C. Farmers' Union, Statesville, N. C.	Farmers' Union 16 Per Cent Acid Phosphate.	Rockwell.	16.83					13.46
6177	Norfolk Fertilizer Works, Norfolk, Va.	Oriana 16 Per Cent Acid Phosphate.	Mount Gillead.	16.05					12.84
6187	Old Buck Guano Co., Richmond, Va.	Old Buck 16 Per Cent Acid Phosphate.	Norwood.	16.86					13.49
6188	Pocomoke Guano Co., Norfolk, Va.	Pocomoke Superb Acid Phosphate.	Denton.	14.56					11.65
6176	Rasin-Monumental Co., Baltimore, Md.	16 Per Cent Acid Phosphate.	Porters.	16.92					13.54
6209	do.	do.	Richfield.	16.82					13.46
6189	Reidsville Fertilizer Co., Reidsville, N. C.	Reidsville Acid Phosphate.	Cid.	14.84					11.87
6203	Robertson Fertilizer Co., Norfolk, Va.	High Peak Acid Phosphate.	Warrenton.	16.63					13.30
6339	Royster, F. S., Guano Co., Norfolk, Va.	Royster's High Grade 16 Per Cent Acid Phosphate.	Dunn.	15.90					12.72
6208	do.	do.	Granite Quarry.	15.80					12.64
6351	Southern Cotton Oil Co., Fayetteville, N. C.	S. C. O. Co.'s 16 Per Cent Acid Phosphate.	Fayetteville.	16.46					14.81
6161	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Special High Grade Acid Phosphate.	Goldsboro.	16.05					12.84
6207	Union Guano Co., Winston, N. C.	Union 16 Per Cent Acid Phosphate.	Albemarle.	16.78					13.42
6192	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Best Acid Phosphate.	Norwood.	16.35					13.08

6152	do.	Southern Chemical Co.'s Champion Acid Phosphate.	Pittsboro.	17.37			13.90
6160	do.	do.	Siler City.	16.95			13.56
6175	do.	Travers & Co.'s Champion Acid Phosphate.	Troy.	17.92			11.34
6130	do.	V. C. C. Co.'s 16 Per Cent Acid Phosphate.	Wadesboro.	16.36			13.04
6202	do.	do.	Henderson.	16.65			12.84
Brand claiming							
6358	Farm Bell Fertilizer Co., Norfolk, Va.	Farm Bell Mixture.	Elizabeth City.	9.82*	1.57	1.19	20.65
6371	Farm Bell Fertilizer Co., Norfolk, Va.	Farm Bell Mixture	Dunn.	11.40*	1.45	1.19	22.15
Brand claiming							
				10.00*			23.43
				1.65	2.00	1.50	23.43
				1.65	2.00	1.00	22.15

*Total Phosphoric Acid valued at 4 cents per pound.

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		Total Potash
Brands claiming										
6357	American Agricultural Chemical Co., Henderson, N. C.	Hot Stuff for Tobacco.	Henderson.	8.32	1.04	.70	1.74	2.11	2.10	26.13
6685	do.	do.	Henderson.	8.10	.98	.68	1.66	2.02	1.94	24.77
6386	American Agricultural Chemical Co., New York, N. Y.	Zell's Special Compound for Tobacco.	Pilot Mountain.	8.25	1.17	.53	1.70	2.07	1.80	24.39
6419	American Fertilizing Co., Norfolk, Va.	Bone and Peruvian Guano	Summerfield.	8.71	1.09	.55	1.64	1.99	1.82	24.70
6289	Armour Fertilizer Works, Greensboro, N. C.	Armour's Slaughter House Fertilizer.	Greensboro	7.78	.95	.51	1.66	2.02	1.78	23.65
6744	do.	Slaughter House for Tobacco.	Stem.	7.47	.82	.80	1.62	1.97	1.88	23.67
6693	Baugh & Sons Co., Baltimore, Md.	Baugh's Old Standby Compound for Tobacco.	Stovall.	8.49	1.06	.80	1.86	2.26	1.90	25.80
6716	do.	do.	Bullocks.	8.40	1.12	.70	1.82	2.21	1.84	25.24
6752	do.	do.	Tar River.	8.10	1.09	.70	1.79	2.18	1.82	24.72
6368	Bryant Fertilizer Co., Alexandria, Va.	Bryant's Cotton Grower.	Dunn.	9.27	1.15	.37	1.52	1.85	1.70	24.15
6472	Cooperative Warehouse Co., Salisbury, N. C.	Farmers' Union 8-2-2 High Grade Guano.	Nashville.	8.73	.34	1.70	2.04	2.48	2.00	27.30
6712	do.	Farmers' Union 8-2-2 Tobacco Guano	Oxford.	7.96	.91	.80	1.71	2.08	2.00	25.14
6463	do.	do.	Nashville.	7.87	.78	.90	1.68	2.04	1.88	24.33
6681	do.	do.	Middleburg.	8.05	.24	1.36	1.60	1.94	1.90	24.27
6680	do.	do.	Dabney.	6.86	.68	.94	1.62	1.97	2.04	23.86
6517	Georgia Chemical Works, Augusta, Ga.	Georgia Formula.	Lumber Bridge.	8.98	1.24	.56	1.80	2.19	1.94	26.24

6437	N. C. Farmers' Union, Statesville, N. C.	N. C. Farmers' Union Tobacco Guano,	Nashville	8.15	.97	1.33	1.80	2.19	1.94	25.41
6392	Old Buck Guano Co., Richmond, Va.	8-2-2. Old Buck Saxon Tobacco	Lucama	7.90	.87	.97	1.81	2.24	2.04	25.83
6556	Palmetto Corporation, Columbia, S. C.	Palmetto Special Fertilizer	Bailey	8.36	.96	.80	1.76	2.14	1.88	25.15
6364	Rasin-Monumental Co., Baltimore, Md.	Rasin Empire Guano for Tobacco	Smithfield	8.61	1.61	.41	2.02	2.46	2.22	25.19
6270	Read Phosphate Co., Charleston, S. C.	Read's Blood and Bone Fertilizer, No. 1.	Morven	7.52	.47	1.13	2.16	2.63	2.16	25.04
6545	Royster, F. S., Guano Co., Norfolk, Va.	Farmers' Bone Fertilizer	Cardenas	8.32	1.24	.62	1.86	2.26	1.94	25.83
6634	do.	Royster's Farmers' Bone Fertilizer for Tobacco	Oxford	8.38	1.38	.56	1.94	2.36	1.82	25.63
6689	do.	do.	Henderson	8.41	1.01	1.50	2.51	3.05	2.11	29.65
6418	do.	do.	Burlington	9.23	.53	1.27	1.80	2.19	1.88	26.19
6223	do.	do.	Kernersville	8.01	1.65	.59	1.64	1.99	2.08	25.33
6258	do.	do.	New Bern	7.99	1.17	.57	1.71	2.11	1.98	25.20
6365	do.	do.	Smithfield	7.96	1.63	.91	1.64	1.99	1.92	24.45
6706	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Red Steer for Tobacco Standard Grade Guano	Oxford	8.12	.67	1.61	2.31	2.81	2.16	30.12
6397	do.	do.	Thomasville	7.41	1.35	.89	2.21	2.72	1.98	26.72
6688	do.	do.	Henderson	8.02	.71	1.12	2.13	2.59	1.94	26.67
6636	do.	do.	Oxford	8.01	1.06	.82	1.88	2.29	1.98	25.81
6753	do.	do.	Stem	8.35	.83	.94	1.77	2.15	1.94	25.18
6663	do.	do.	Watkins	8.65	.36	1.21	1.60	1.94	2.02	25.47
6665	do.	do.	Watkins	8.16	.80	.94	1.74	2.11	1.98	25.37
6654	do.	do.	Oxford	8.18	.88	.84	1.72	2.09	1.92	25.00
6649	do.	do.	Oxford	8.13	.82	.81	1.66	2.02	1.98	25.00
6627	do.	do.	Oxford	8.68	.92	.80	1.72	2.09	1.72	24.50
6662	do.	do.	Watkins	7.28	.18	1.40	1.58	1.92	1.96	23.72
6348	Vu-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Genuine Bone and Peruvian Guano	Angier	7.95	1.27	.55	1.82	2.21	2.12	26.19
6283	do.	do.	Hillsboro	8.20	1.29	.47	1.76	2.11	1.94	25.29

ANALYSES OF COMMERCIAL FERTILIZERS - Continued.
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Total Potash	Relative Value per Ton at Factory
				Available Phosphoric Acid	Water Soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		
Brands claiming										
6750	Va.-Car. Chemical Co., Richmond, Va.	Old Dominion Guano Co.'s Farmers' Friend High Grade Fertilizer.	Hester	8.00	1.14	.56	1.65	2.00	2.00	\$ 24.93
6407	do.	Stonewall Tobacco Guano.	Walnut Cove	8.88	1.45	.45	1.90	2.31	1.92	26.46
Brands claiming										
6816	Coe-Mortimer Co., Charleston, S. C.	Coe-Mortimer Co.'s 8-3-1 Fertilizer.	Wilson	8.00	1.39	.38	2.47	3.00	1.00	23.37
6829	Contenteca Guano Co., Wilson, N. C.	Matchless Tobacco Grower.	Wilson	8.71	1.56	.72	2.28	2.77	.94	22.99
6473	Cooperative Warehouse Co., Salisbury, N. C.	Farmers' Union 8-3-1 Guano.	Nashville	8.06	1.24	1.48	2.72	3.31	1.18	25.38
6438	do.	do.	Nashville	8.17	.38	2.00	2.38	2.89	2.18	29.07
6399	Norfolk Fertilizing Co., Norfolk, Va.	Oriana 3-8-1 Fertilizer.	Nashville	8.00	1.39	1.05	2.44	2.97	1.14	23.95
6819	Powhatan Chemical Co., Richmond, Va.	Hustler Tobacco Special.	Monroe	8.11	1.31	1.37	2.68	3.26	1.14	25.07
6810	do.	do.	Wilson	8.19	1.42	1.20	2.62	3.19	78	23.09
6821	do.	do.	Wilson	7.94	.96	1.46	2.42	2.94	.94	22.80
6470	Rasin-Monumental Co., Baltimore, Md.	P. C. Co.'s Special Fertilizer.	Wilson	7.80	.42	1.02	2.44	2.97	.88	2.45
6455	Richmond Guano Co., Richmond, Va.	Gilt Edge Tobacco Special.	Nashville	9.27	1.42	.82	2.24	2.72	1.02	23.78
6381	Southern Cotton Oil Co., Charlotte, N. C.	S. C. O. Co.'s Ammoniated.	Nashville	7.61	2.04	.70	2.74	3.33	.92	23.72
6806	Union Guano Co., Winston, N. C.	Union Special Ammoniated Mixture.	Morven	9.54	.23	1.65	1.88	2.29	.96	22.24
			Lucama	10.71	1.02	.76	1.78	2.16	1.02	23.29

Brands claiming		8.00	2.47	3.00	2.00	28.37				
6560	Craven Chemical Co., New Bern, N. C.	C. E. Foy's "C. E. F." High Grade Revised.	Grifton	8.00	.20	1.28	2.48	3.02	2.04	28.62
6557	Imperial Company, Norfolk, Va.	Imperial 3-8-2 Fertilizer.	Bailey	8.51	2.00	.78	2.78	3.38	2.02	30.29
6312	Miller Fertilizer Co., Baltimore, Md.	Miller's Standard.	Whitakers	8.11	2.01	.55	2.56	3.11	2.10	29.36
6341	Pearsall & Co., Wilmington, N. C.	Pearsall's Use-Me High Grade Guano	Kerr	5.77	1.40	1.25	2.65	3.22	2.12	27.50
6344	do.	do.	Kerr	6.95	1.00	1.19	2.19	2.66	1.84	25.35
6342	do.	do.	Kerr	6.74	.58	1.23	1.81	2.20	1.98	24.24
6346	do.	do.	Kerr	6.81	.60	1.37	1.97	2.10	1.72	23.68
6327	do.	V.-C. C. Co.'s Farmers' Success Revised.	Vanceboro	8.11	1.24	1.51	2.78	3.38	2.38	31.69
6328	do.	do.	Vanceboro	8.16	1.20	1.52	2.72	3.31	2.04	29.78
6340	do.	V.-C. C. Co.'s Farmers' Success C. S. M. Revised.	Maxton	8.12	.91	1.27	2.18	2.65	1.68	25.98
Brands claiming		9.00	1.65	2.00	1.00	20.93				
6416	American Fertilizer Co., Norfolk, Va.	American Panacea Guano	Poplar Branch	8.34	1.67	.29	1.96	2.38	2.26	27.87
6695	do.	do.	Stovall	9.97	1.16	.62	1.78	2.16	.92	22.65
6322	Armour Fertilizer Works, Greensboro, N. C.	Armour's No. 971 Fertilizer	Hendersonville	9.21	.75	.75	1.50	1.82	1.02	20.61
6287	Martin Fertilizer Co., Norfolk, Va.	Martin's Nine-Two-One	Haw River	9.40	1.03	1.13	2.16	2.63	.86	22.77
6382	Norfolk Fertilizing Co., Norfolk, Va.	Oriana 2-9-1 Fertilizer	Monroe	9.50	1.25	.83	2.08	2.53	1.20	24.24
6214	Pocomoke Guano Co., Norfolk, Va.	Pocomoke 2-9-1 Fertilizer	Waxhaw	8.96	1.29	.35	1.64	1.99	2.08	26.25
6505	do.	do.	Stanfield	9.99	1.46	.56	1.96	2.31	.84	22.12
6224	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Honey Bee Special Compound	Kernersville	9.30	1.55	.80	2.14	2.97	2.08	29.95
6319	V.-C. Chemical Co., Richmond, Va.	Allison & Addison's Star Brand Guano	Hendersonville	9.55	.91	.43	1.34	1.63	1.11	20.88
Brand claiming		9.00	2.06	2.50	1.00	22.65				
6378	Armour Fertilizer Works, Greensboro, N. C.	Armour's No. 9-2½-1 Fertilizer	West End	9.10	1.35	.77	2.12	2.58	1.06	23.30
Brand claiming		9.00	2.47	3.00	.50	21.87				
6510	Union Seed and Fertilizer Co., Wilmington, N. C.	U. S. & F. Co. Brand, No. 4	Parkton	9.17	1.22	1.71	2.96	3.60	.71	25.30
6511	do.	do.	Parkton	9.26	1.06	1.66	2.72	3.31	.60	23.68

ANALYSES OF COMMERCIAL FERTILIZERS—Continued.
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition of Parts per 100					Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-Soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		Total Potash
	Brand claiming			9.00				2.47 3.00 1.00	\$ 24.37
6408	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Farmers' Choice.	Walnut Cove.	10.01	1.79	.41		2.40 2.92 1.42	27.18
	Brand claiming			9.00				2.88 3.50 .80	25.10
6301	Eastern Cotton Oil Co., Hertford, N. C.	Half and Half Cotton-seed Meal and Acid Phosphate.	Columbia.	9.10	.21	2.71		2.92 3.55 1.00	26.36
	Brand claiming			9.00				2.26 2.75 2.00	28.49
6302	Va.-Car. Chemical Co., Richmond, Va.	Va.-Car. Chemical Co.'s Prolific Cotton Grower.	Smithfield.	10.44	1.45	.99		2.44 2.97 1.72	29.29
	Brand claiming			7.00				4.11 5.00 1.00	29.26
6295	Pocomoke Guano Co., Norfolk, Va.	Pocomoke 5-7-1 Fertilizer.	Columbia.	7.19	3.23	.93		4.16 5.06 1.24	30.86
	Brand claiming			7.00				4.11 5.00 2.00	34.26
6331	Peruvian Guano Corporation, Charleston, S. C.	Peruvian Potato Formula.	Elizabeth City.	7.40	4.01	.27		4.28 5.20 1.96	35.18
	Brands claiming			6.00				4.11 5.00 5.00	48.30
6302	Eastern Cotton Oil Co., Hertford, N. C.	Our Surprise Potato Producer.	Columbia.	5.31	1.43	2.43		3.86 4.69 5.00	46.52
6357	Grandy, N. G., & Co., Elizabeth City, N. C.	Grandy's 5-6-5 Potato Manure.	Elizabeth City.	5.65	3.01	2.11		5.12 6.27 4.92	51.75
	Brands claiming			6.00				4.11 5.00 1.00	28.30
6300	Eastern Cotton Oil Co., Hertford, N. C.	Substitute for Non Such Potato Grower.	Columbia.	6.26	1.59	2.43		4.02 4.89 1.42	30.24
6412	N. C. Farmers' Union, Statesville, N. C.	N. C. Farmers' Union Guano.	Currituck.	6.10	2.69	.85		3.54 4.30 .92	25.57

	Brand claiming		6.00	5.77	7.02	1.00	35.23
6307	Atlantic Chemical Co., Norfolk, Va.....	Atlantic Cheshire 7 Per Cent Potato Guano.....	6.08	3.89	1.55	5.44	6.61 1.02 34.03
Brand claiming			6.00	3.29	4.00	1.00	24.82
6413	N. C. Farmers' Union, Statesville, N. C.....	N. C. Farmers' Union Guano.....	6.16	2.49	.61	3.10 3.77	.90 23.68
Brands claiming			5.00	4.11	5.00		22.26
6487	Pearsall & Co., Wilmington, N. C.....	Pearsall's Fish and Marl Mixture.....	4.75	1.96	1.86	3.82	4.64 20.79
6488	do.....	do.....	4.70	1.64	1.90	3.54	4.30 19.57
Brands claiming			6.00	3.29	4.00		19.82
6493	Acme Mfg. Co., Wilmington, N. C.....	Acme 6-4 Fertilizer.....	9.19	2.11	1.30	3.44	4.18 23.64
6402	do.....	do.....	5.76	2.59	1.25	3.84	4.67 21.89
6403	do.....	do.....	6.10	2.25	1.29	3.54	4.30 20.97
6794	do.....	do.....	6.25	2.06	1.18	3.24	3.94 19.86
6773	do.....	do.....	5.93	1.22	1.98	3.20	3.89 19.37
6772	do.....	do.....	5.98	1.92	1.26	3.18	3.87 19.34
6684	American Agricultural Chemical Co., New York, N. Y.....	Carolina Formula.....	6.56	2.00	1.38	3.38	4.11 20.76
6411	Cooperative Warehouse Co., Salisbury, N. C.....	Farmers' Union Ammoniated Compound.....	6.92	1.54	1.70	3.24	3.94 20.53
6318	Cotton Oil and Fertilizer Co., Rocky Mount, N. C.....	Meat and Fish Mixture.....	5.33	1.37	1.91	3.28	3.99 19.11
6526	Norfolk Fertilizing Co., Norfolk, Va.....	Oriana Fertilizer.....	6.31	2.40	.76	3.16	3.81 19.58
6453	Resin-Monumental Co., Baltimore, Md.....	Ammoniated Superphosphate.....	11.40	.76	1.88	2.64	3.21 22.19
6435	Richmond Guano Co., Richmond, Va.....	Edwards' Cotton Grower.....	5.54	1.57	1.69	3.26	3.96 19.23
6524	Royster, F. S., Guano Co., Norfolk, Va.....	Royster's Flag-staff Ammoniated Phosphate.....	6.05	2.10	.86	2.96	3.60 18.48
6484	Southern Cotton Oil Co., Charlotte, N. C.....	S. C. O. Co.'s Ammoniated Compound.....	6.96	1.07	2.16	3.23	3.93 20.53
6774	do.....	do.....	7.93	.86	1.42	2.28	2.77 17.51
6846	do.....	do.....	5.96	.98	1.20	2.18	2.65 15.12

ANALYSES OF COMMERCIAL FERTILIZERS—Continued.
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Total Potash	Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-Soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia			
Brand claiming											
6224	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Ammoniated Superphosphate.	Elizabeth City	6.00	4.11	5.00	4.11	5.00	—	\$ 23.30	
Brand claiming											
6783	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Top Dresser	St. Paul	6.38	7.94	.20	8.14	9.90	—	40.61	
Brand claiming											
6351	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Virginia Potato Grower H. G. Guano.	Elizabeth City	7.00	—	—	4.11	5.00	—	24.26	
Brand claiming											
6256	Meadows, E. H. & J. A., Co., New Bern, N. C.	Meadows' Cabbage Guano.	New Bern	7.10	3.03	2.87	5.90	7.17	—	31.88	
Brands claiming											
6310	Planters Cotton Oil and Fertilizer Co., Rocky Mount, N. C.	Meal and Fish Mixture, No. 3	Whitakers	8.00	—	—	2.47	3.00	—	18.37	
6315	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Morgan's Ammoniated Compound.	Ahoskie	6.71	1.13	1.69	2.82	3.43	—	18.55	
Brands claiming											
6492	Acme Mfg. Co., Wilmington, N. C.	Acme 8-4 Fertilizer	Red Springs	10.39	2.69	.23	2.92	3.55	—	22.65	
6353	—do—	—do—	Raeeford	8.00	—	—	3.29	4.00	—	21.82	
6354	—do—	—do—	Fayetteville	7.81	2.28	1.36	3.64	4.43	—	23.10	
6791	Conestee Chemical Co., Wilmington, N. C.	Conestee 8-4 Fertilizer	White Oak	8.36	1.93	1.45	3.38	4.11	—	22.46	
6559	Contentinea Guano Co., Wilson, N. C.	Climax Special	Bailey	8.91	1.63	1.45	3.08	3.74	—	21.85	
				8.78	1.54	1.72	3.26	3.96	—	22.47	
				8.01	1.82	1.42	3.24	3.94	—	21.62	

6393	.....do.....	High Grade Cotton Guano.....	Lucama.....	7.93	1.61	1.65	3.26	3.60	21.62
6479	Cooperative Warehouse Co., Salisbury, N. C.	Farmers' Union Ammoniated Compound	Wake Forest.....	13.03	.40	2.18	2.59	3.15	23.91
6778	Cotton States Fertilizer Works, Wilmington, N. C.	Cotton States Ammoniated Phosphate...	Newton Grove.....	8.79	.62	2.46	3.08	3.74	21.73
6422	Georgia Chemical Co., Augusta, Ga.....	Georgia Special.....	Trenton.....	7.32	2.25	.89	3.14	3.82	20.51
6790	Imperial Company, Norfolk, Va.....	Imperial S-4 Fertilizer.....	White Oak.....	8.12	2.14	.81	2.98	3.62	20.64
6267	Martin Fertilizer Co., Norfolk, Va.....	Martin Ammoniated Compound.....	Southfield.....	8.98	2.07	.95	3.02	3.67	20.76
6450	McNair Phosphate Co., Laurinburg, N. C.	S-4 Ammoniated Guano.....	Red Springs.....	7.68	2.30	1.18	3.18	4.23	22.30
6787	Navassa Guano Co., Wilmington, N. C.	Navassa H. G. Ammoniated Superphosphate.....	Wilmington.....	8.61	2.48	.78	3.26	3.96	22.30
7061	Norfolk Fertilizing Co., Norfolk, Va.....	Oriana S-4 Fertilizer.....	Fayetteville.....	8.35	2.26	.86	3.12	3.79	21.45
6525	.....do.....	do.....	Fayetteville.....	8.30	2.16	.89	2.96	3.69	20.73
6553	Panlico Chemical Co., Washington, N. C.	Panlico Acid Fish Mixture.....	Grafton.....	8.40	2.54	1.11	3.68	4.17	23.86
6554	.....do.....	do.....	Grafton.....	7.78	2.20	1.28	3.48	4.24	22.10
6401	Peruvian Guano Corporation, Charleston, S. C.	Peruvian Cotton Formula.....	Fairmont.....	8.45	2.67	.43	3.10	3.77	21.47
6502	Pocomoke Guano Co., Norfolk, Va.....	4-8 Fertilizer.....	Matthews.....	8.32	2.48	1.06	3.54	4.30	23.19
6822	Powhatan Chemical Co., Richmond, Va.	North Star Guano.....	Wilson.....	8.08	2.40	1.00	3.40	4.13	22.36
6544	Robeson Mfg. Co., Lumberton, N. C.	1916-A.....	Lumberton.....	8.03	1.74	1.40	3.11	3.82	21.22
6512	.....do.....	do.....	Lumber Bridge.....	7.86	1.82	1.40	3.22	3.91	21.38
6838	Sotland Neck Guano Co., Scotland Neck, N. C.	Fish Scrap Guano.....	Hobgood.....	9.38	.12	2.74	3.16	3.81	22.65
6845	Southern Cotton Oil Co., Charlotte, N. C.	S. C. O. Co.'s Ammoniated Compound.....	Morven.....	7.96	1.80	1.30	3.10	3.77	20.98
6592	Southern Cotton Oil Co., Fayetteville, N. C.	do.....	Fayetteville.....	8.53	1.12	2.30	3.12	4.16	22.89
6565	.....do.....	do.....	Hope Mills.....	7.95	1.38	2.10	3.48	4.23	22.57
6566	.....do.....	do.....	Hope Mills.....	7.66	1.22	2.10	3.32	4.01	21.60
6564	.....do.....	do.....	Hope Mills.....	8.12	1.46	1.50	2.96	3.60	20.55
6483	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Ammoniated Phosphate.....	Red Springs.....	7.37	.77	2.01	2.81	3.12	19.17
6867	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Quickstep Ammoniated Compound.....	Grafton.....	8.41	2.98	.32	3.30	4.01	22.27
6424	.....do.....	do.....	Trenton.....	8.31	2.41	.77	3.18	3.87	21.67

ANALYSES OF COMMERCIAL FERTILIZERS—*Continued*,
MIXED FERTILIZERS.

Laboratory Number.	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Total Potash	Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		
Brands claiming										
6562	Va-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s 8-1 Ammoniated Superphosphate.	Hope Mills.	8.00	2.56	.68	3.29	4.00	—	\$ 21.82
Brands claiming										
6360	Baugh & Sons Co., Norfolk, Va.	Baugh's A. M. M. Phosphate Soil and Crop Fertilizer.	Elizabeth City.	7.66	3.39	.99	4.38	5.33	—	26.06
6414	Farmers Guano Co., Norfolk, Va.	F. G. C. Ammoniated Phosphate.	Water Lily.	8.04	2.95	1.05	4.00	4.86	—	24.84
6328	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Apollo Special Trucker.	Elizabeth City.	8.20	2.99	1.15	4.14	5.08	—	25.59
Brands claiming										
6518	Acme Mfg. Co., Wilmington, N. C.	Acme 9-3 Fertilizer	Lumber Bridge.	8.42	1.52	1.36	2.88	3.50	—	20.52
6567	do.	do.	Dunn.	9.72	1.47	1.69	2.56	3.11	—	20.47
6793	do.	do.	St. Paul.	8.56	1.32	1.38	2.70	3.28	—	19.90
6370	Carabagh Phosphate and Fertilizer Works, Raleigh, N. C.	Carabagh Ammoniated Phosphate.	Dunn.	9.81	1.17	1.67	2.81	3.15	—	21.74
6405	do.	do.	Fairmont.	10.28	.93	1.49	2.42	2.94	—	20.41
6771	Conestee Chemical Co., Wilmington, N. C.	Conestee 9-3 Fertilizer.	Lumberton.	8.80	1.26	1.16	2.42	2.94	—	18.96
6394	Contentnea Guano Co., Wilson, N. C.	Special Cotton Grower	Lucama.	8.97	1.37	1.23	2.60	3.16	—	19.89
6589	Imperial Company, Norfolk, Va.	Imperial 3-9 Fertilizer	Lumberton.	9.93	2.06	1.04	3.10	3.77	—	22.95
6550	do.	do.	St. Paul.	9.56	1.80	.88	2.68	3.26	—	20.82
6811	do.	do.	Lucama.	9.20	1.78	.64	2.42	2.94	—	19.36
6372	Joscy, N. B., Guano Co., Tarboro, N. C.	Joscy's 9-3 Fish Scrap Guano.	Dunn.	8.78	.51	1.87	2.38	2.89	—	18.78

6799	Martin Fertilizer Co., Norfolk, Va.	Martin's Ammoniated Compound	Dunn	8.82	1.54	.90	2.44	2.97	19.07
6870	Navassa Guano Co., Wilmington, N. C.	Navassa Standard Ammoniated Super-phosphate	Fayetteville	10.91	2.48	.26	2.74	3.33	22.42
6788	do	do	White Oak	9.18	1.64	.78	2.42	2.94	19.34
6834	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Onslow Crop Grower	Vanceboro	8.81	.98	1.90	2.88	3.50	20.91
6846	Planters Cotton Oil Co., Rocky Mount, N. C.	Fish Scrap, No. 3	Castalia	7.62	.64	1.74	2.38	2.89	17.62
6821	Richmond Guano Co., Richmond, Va.	Gilt Edge Guano	Benson	8.56	1.36	1.40	2.76	3.36	20.15
6830	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Simplex Ammoniated Phosphate	Henderson	9.96	1.60	.78	2.43	2.95	20.17
6768	do	do	St. Paul	9.21	1.61	.82	2.46	2.90	19.51
6829	do	do	Vanceboro	8.42	1.86	.74	2.60	3.16	19.34
6400	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Ammoniated Phosphate, Standard Grade	Thomasville	8.01	.75	1.85	2.60	3.16	18.93
6442	Vac-Car, Chemical Co., Richmond, Va.	Vac-Car, C. Co.'s Blue Ribbon Ammoniated Compound	Nashville	9.48	1.61	.76	2.40	2.92	19.56
6339	do	Vac-Car, C. Co.'s Cotton Ammoniated Compound	Maxton	10.41	1.83	.57	2.40	2.92	20.49
Brand claiming									
6316	Planters Cotton Oil and Fertilizer Co., Rocky Mount, N. C.	Mead and Fish Mixture No. 1	Whitakers	7.76	1.79	2.07	3.86	4.69	23.97
Brands claiming									
6410	Farmers' Union Agency Co., Winston, N. C.	Farmers' Union Agency Co.'s No. 2	Winston	7.69	.23	.58	.98	1.19	11.81
6509	Rock Hill Fertilizer Co., Rock Hill, S. C.	Piedmont Fertilizer	Pineville	9.97	.42	2.28	2.70	3.28	21.31
Brands claiming									
6827	Baugh & Sons Co., Norfolk, Va.	Baugh's Ammoniated Superphosphate	Lucama	10.53	1.76	.68	2.44	2.97	20.77
6540	do	do	Vanceboro	9.68	1.76	.84	2.60	3.16	20.60
6305	Carolina Union Fertilizer Co., Norfolk, Va.	Carolina Union 3-10	Roper	10.74	1.75	.91	2.66	3.23	21.91
6588	Imperial Company, Norfolk, Va.	Imperial 3-10 Fertilizer	Lamberton	11.48	1.52	1.06	2.58	3.11	22.32
6273	Read Phosphate Co., Charleston, S. C.	Read's Blood and Bone Mixture	Monroe	11.82	1.41	1.11	2.52	3.06	22.40
Brand claiming									
6802	Craven Chemical Co., New Bern, N. C.	C. C. Co.'s Ammoniated Compound, No. 104	Sanford	10.43	2.71	.60	3.34	1.06	24.16
				10.00			3.29	4.00	23.82

ANALYSES OF COMMERCIAL FERTILIZERS—Continued.
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphate Acid	Water- soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		Total Potash
	Brands claiming			10.00			3.29	4.00	\$ 23.82
6380	Etiwan Fertilizer Co., Charleston, S. C.	Etiwan Ammoniated Mixture	Morven	10.48	2.09	1.47	3.56	4.33	25.43
	Brands claiming			11.00			2.47	3.00	21.37
6354	Crow Bros., Monroe, N. C.	Crow's Mixture	Monroe	12.06	.82	1.46	2.28	2.77	21.64
	Brands claiming			12.00			1.65	2.00	18.93
6178	Cooperative Warehouse Co., Salisbury, N. C.	Farmers' Union Ammoniated Compound	Wake Forest	12.98	.27	2.16	2.43	2.95	23.19
6240	Richmond Guano Co., Richmond, Va.	Ammoniated Phosphate	Concord	11.54	1.17	.75	1.92	2.33	19.60
	Brands claiming			12.00			3.29	4.00	25.82
6275	Read Phosphate Co., Charleston, S. C.	Read's Blood and Bone Mixture	Monroe	13.80	1.09	2.07	3.16	3.81	27.07
6841	Southern Cotton Oil Co., Shelby, N. C.	S. C. O. Co.'s Ammoniated Compound	Shelby	10.25	.74	1.88	2.62	3.19	21.25
RAW OR UNMIXED FERTILIZER MATERIALS.									
	Brands claiming			14.00					\$ 12.60
6291	Atlantic Chemical Corporation, Norfolk, Va.	Atlantic 14 Per Cent Acid Phosphate	Burlington	13.86					12.47
6279	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s 14 Per Cent Acid Phos- phate.	Graham	14.21					12.79
	Brands claiming			16.00					14.40
6352	Acme Mfg. Co., Wilmington, N. C.	16 Per Cent Acid Phosphate	Raeford	17.22					15.50

6574	.....do.....do.....	Hope Mills.....	18.16	16.34
6572	.....do.....do.....	Hope Mills.....	18.35	16.51
6250	.....do.....do.....	Waxhaw.....	18.03	16.23
6397	American Fertilizing Co., Norfolk, Va.....	Wadesboro.....	16.16	14.54
6292	Armour Fertilizer Works, Wilmington, N. C.....	White Oak.....	15.38	13.84
6520	.....do.....do.....	Parkton.....	16.31	14.68
6235	Armour Fertilizer Works, Greensboro, N. C.....	Greensboro.....	16.27	14.61
6249	.....do.....do.....	Concord.....	16.05	14.44
6323	Asheville Packing Co., Asheville, N. C.....	Asheville.....	15.00	13.50
6314	Atlantic Chemical Corporation, Norfolk, Va.....	Palmyra.....	15.97	14.37
6288	Baugh & Sons Co., Philadelphia, Pa.....	Graham.....	16.05	14.44
6499	Caraligh Phosphate and Fertilizer Works, Raleigh, N. C.....	Rosboro.....	17.38	15.64
6464	.....do.....do.....	Tillery.....	17.38	16.00
6404	.....do.....do.....	Farmount.....	17.85	16.06
6601	.....do.....do.....	Fayetteville.....	17.21	15.49
6358	.....do.....do.....	Fayetteville.....	16.81	15.13
6304	Carolina Union Fertilizer Co., Norfolk, Va.....	Roper.....	16.09	14.49
6436	Chickamauga Fertilizer Co., Chattanooga, Tenn.....	Murphy.....	16.09	14.48
6357	Condabbee Fertilizer Co., Charleston, S. C.....	Fayetteville.....	16.83	15.15
6355	.....do.....do.....	Fayetteville.....	17.08	15.37
6369	.....do.....do.....	Fayetteville.....	17.16	15.11
6356	.....do.....do.....	Fayetteville.....	16.41	15.77
6363	.....do.....do.....	Fayetteville.....	15.79	14.21
6313	Conestee Chemical Co., Wilmington, N. C.....	Enfield.....	17.32	15.59
6480	Cooperative Warehouse Co., Salisbury, N. C.....	Wake Forest.....	16.80	15.42

Farmers' Union Acid Phosphate, 16 Per Cent High Grade.

ANALYSES OF COMMERCIAL FERTILIZERS—Continued,
RAW OR UNMIXED FERTILIZER MATERIALS.

Laboratory Number.	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphoric Acid	Water- soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		Total Potash
Brands claiming									
6429	Cooperative Warehouse Co., Salisbury, N. C.	Farmers' Union Acid Phosphate, 16 Per Cent High Grade.	Statesville.	16.00					\$ 14.40
6780	do.	do.	Rockwell.	16.93					15.24
6213	Cotton States Fertilizer Works, Atlanta, Ga.	Cotton States Acid Phosphate, High Grade.	Richfield.	16.27					14.64
6248	Etiwan Fertilizer Co., Charleston, S. C.	Etiwan 16 Per Cent Acid Phosphate.	Morven.	16.78					15.10
6516	Georgia Chemical Works, Augusta, Ga.	High Grade Dissolved Bone Phosphate.	Lumber Bridge.	16.03					14.43
6229	do.	do.	Greensboro.	17.95					16.15
6420	do.	do.	Trenton.	15.90					14.31
6770	Imperial Company, Norfolk, Va.	Imperial H. G. Tennessee Acid Phos- phate.	St. Paul.	16.80					15.12
6374	do.	do.	Wadesboro.	16.55					14.89
6356	do.	do.	Fairfield.	17.47					15.72
6286	Martin Fertilizer Co., Norfolk, Va.	Martin's Acid Phosphate.	Haw River.	16.27					14.64
6394	do.	do.	Dunn.	16.42					14.78
6252	Meadows, E. H. & J. A. Co., New Bern, N. C.	Meadows' Diamond Acid Phosphate.	New Bern.	16.24					14.62
6277	The MacMurphy Co., Charleston, S. C.	High Grade Acid Phosphate.	Morven.	16.45					14.80
6549	do.	do.	St. Paul.	16.21					14.59
6344	McNair Phosphate Co., Laurinburg, N. C.	Acid Phosphate.	Laurinburg.	16.68					15.01
				14.91					13.42

6413	Navassa Guano Co., Wilmington, N. C.	Navassa 16 Per Cent Acid Phosphate	Mayssville	16.45	14.80
6480	do	do	Red Springs	16.70	15.03
6265	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	16 Per Cent Acid Phosphate	New Bern	14.17	12.75
6398	Nitrate Agencies Co., New York, N. Y.	do	Williamston	16.48	14.83
6366	do	do	Manchester	15.92	14.33
6355	do	do	Elizabeth City	16.12	14.51
6457	do	do	Seotland Neck	16.37	14.91
6269	Norfolk Fertilizing Co., Norfolk, Va.	Oriana 16 Per Cent Acid Phosphate	Wadesboro	17.79	16.01
6395	do	do	Fayetteville	18.06	16.25
6393	Palmetto Guano Corporation, Columbia, S. C.	Palmetto Acid Phosphate	Wadesboro	17.03	15.33
6394	do	do	Albemarle	16.75	15.07
6427	do	do	Charlotte	17.03	15.33
6367	Pamlico Chemical Co., Washington, N. C.	Pamlico High Grade Acid Phosphate	Hope Mills	16.07	14.16
6297	Phillips Fertilizer Co., Washington, N. C.	Phillips' High Grade 16 Per Cent Acid Phosphate	Washington	16.15	14.53
6245	Pocomoke Guano Co., Norfolk, Va.	Pocomoke Superb Acid Phosphate, 16 Per Cent.	Morven	16.58	14.92
6504	do	do	Stanfield	17.38	15.61
6311	do	do	Enfield	16.93	15.02
6298	do	do	Belhaven	15.87	14.26
6446	Powlatan Chemical Co., Richmond, Va.	Magie Dissolved Bone Phosphate	Black Creek	16.37	14.71
6425	Richmond Guano Co., Richmond, Va.	Rex Dissolved Bone	Hendersonville	16.30	14.67
6212	Royster, F. S., Guano Co., Norfolk, Va.	Royster's High Grade 16 Per Cent Acid Phosphate	Waxhaw	16.55	14.80
6226	do	do	Kernersville	16.76	15.08
6353	do	do	Elizabeth City	16.02	14.12
6767	Southern Cotton Oil Co., Charlotte, N. C.	S. C. O. Co.'s 16 Per Cent Acid Phos- phate	Reinert	16.88	15.19
6797	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Special High Grade Acid Phos- phate	Monroe	16.31	14.68
6266	do	do	Wadesboro	17.21	15.49

ANALYSES OF COMMERCIAL FERTILIZERS—Continued,
RAW OR UNMIXED FERTILIZER MATERIALS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	(Organic) Nitrogen	Total Nitrogen	Equivalent to Ammonia		Total Potash
Brands claiming									
6581	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Special High Grade Acid Phosphate.	Maxton	16.00					\$ 14.40
6433	do.	do.	Murphy	15.85					14.26
6550	do.	do.	Oxford	16.01					14.44
6236	Union Guano Co., Winston, N. C.	Union 16 Per Cent Acid Phosphate	Waxhaw	15.88					14.29
6320	Va.-Car. Chemical Co., Richmond, Va.	Click's Acid Phosphate, 16 Per Cent.	Hendersonville	17.32					15.59
6222	do.	Durham Fertilizer Co.'s Best Acid Phosphate.	Mocksville	15.97					14.37
6281	do.	Owl Brand High Grade Acid Phosphate.	Hillsboro	15.46					31.91
6384	do.	V.-C. C. Co.'s 16 Per Cent Acid Phosphate.	Kinston	16.57					14.91
6349	do.	do.	Washington	16.77					15.09
6508	do.	do.	Pineville	17.33					15.60
6280	do.	do.	Graham	16.81					15.13
				16.96					15.26

LEAF TOBACCO SALES FOR MARCH, 1916.

Pounds sold for producers, first hand.....	1,948,653
Pounds sold for dealers.....	152,214
Pounds sold for warehouses.....	398,450
Total.....	<u>2,497,517</u>

LEAF TOBACCO SALES FOR APRIL, 1916.

Pounds sold for producers, first hand.....	507,534
Pounds sold for dealers.....	76,276
Pounds sold for warehouses	57,537
Total.....	<u>641,347</u>

THE BULLETIN
OF THE
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE
RALEIGH

Vol. 37, No. 7

JULY, 1916

Whole No. 222

PRUNING

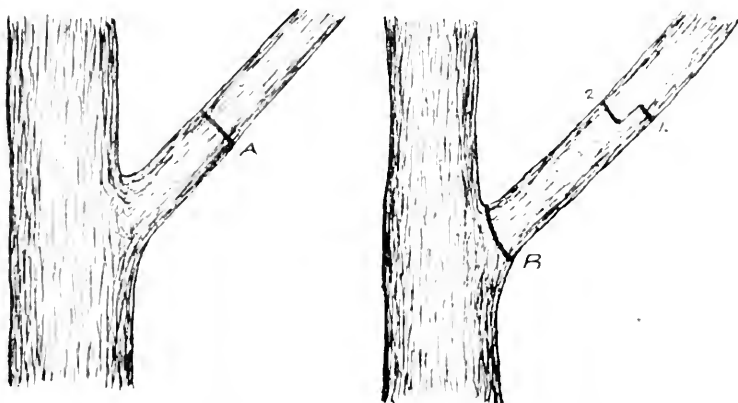


FIG. 1.—Improper (A) and proper (B) ways of cutting off a branch.

PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Postoffice at Raleigh, N. C., as second class matter,
February 7, 1901, under Act of June 6, 1900.

EDWARDS & BROUGHTON PRINTING CO., RALEIGH, N. C.

STATE BOARD OF AGRICULTURE

F. P. LATHAM	W. A. GRAHAM, Commissioner, <i>ex officio</i> Chairman, Raleigh.	Belhaven.	First District.
C. W. MITCHELL	Aulander.		Second District.
R. L. WOODARD	Pamlico.		Third District.
CLARENCE POE	Raleigh.		Fourth District.
K. W. SCOTT	Haw River.		Fifth District.
A. T. McCALLUM	Red Springs.		Sixth District.
C. C. WRIGHT	Hunting Creek.		Seventh District.
WILLIAM BLEDSOE	Gale.		Eighth District.
W. J. SHUFORD	Hickory.		Ninth District.
A. CANNON	Horse Shoe.		Tenth District.

Officers and Staff

W. A. GRAHAM	Commissioner.
K. W. BARNES	Secretary and Purchasing Agent.
MISS SARAH D. JONES	Bookkeeper.
D. G. CONN	Bulletin Superintendent.
B. W. KILGORE	State Chemist, Director Test Farms.
J. M. PICKEL	Feed Chemist.
W. G. HAYWOOD	Fertilizer Chemist.
J. Q. JACKSON	Assistant Chemist.
E. S. DEWAR	Assistant Chemist.
E. B. HART	Assistant Chemist.
D. M. McCARTY	Assistant Chemist.
F. C. WIGGINS	Assistant Chemist.
J. F. HATCH	Fertilizer Clerk.
R. W. COLLETT	Assistant Director Test Farms.
H. H. BRIMLEY	Curator of Museum.
T. W. ADICKES	Assistant Curator.
FRANKLIN SHERMAN, JR.	Entomologist.
R. W. LEIBY	Assistant Entomologist.
S. C. CLAPP	Assistant Entomologist in Field Work.
B. B. FLOWE	Veterinarian.
H. P. FLOWE	Assistant Veterinarian.
W. N. HUTT	Horticulturist.
R. G. HILL	Assistant Horticulturist.
B. SZYMONIAK	Demonstrator Fruit and Truck Crops.
C. D. MATTHEWS	Assistant Horticulturist.
T. B. PARKER	Director of Farmers' Institutes.
W. M. ALLEN	Chemist and Chief, Division Food and Oil Inspection.
E. W. THORNTON	Assistant Chemist, Division Food and Oil Inspection.
C. E. BELL	Assistant Chemist, Division Food and Oil Inspection.
LELAND B. RHODES	Assistant Chemist, Division Food and Oil Inspection.
C. B. WILLIAMS	Chief, Division of Agronomy.
J. K. PLUMMER	Soil Chemist.
W. F. PATE	Agronomist in Soils.
R. Y. WINTERS	Plant Breeding.
W. E. HEARN	State Soil Agent.
L. L. BRINKLEY	Soil Survey.
H. D. LAMBERT	Soil Survey.
S. O. PERKINS	Soil Survey.
J. L. BURGESS	Agronomist and Botanist.
C. H. WALDRON	Assistant Botanist and Seed Analyst.
MISS LOUISE A. RADEMACHER	Assistant to Botanist.
MISS ALSTON DARGAN	Assistant to Botanist.
DAN T. GRAY	Chief in Animal Industry.
R. S. CURTIS	Associate in Animal Industry.
W. H. EATON	Dairy Experimentor.
ALVIN J. REED	Dairy Farming.
STANLEY COMBES	Assistant in Dairy Farming.
J. A. AREY	Assistant in Dairy Farming.
F. R. FARNHAM	Assistant in Dairy Farming.
F. T. PEDEN	Beef Cattle.
EARL HOSTETLER	Assistant in Beef Cattle and Swine.
W. L. JERDAN	Beef Cattle.
H. E. CASE	Assistant in Beef Cattle.
H. P. FOLK	Pig Clubs.
W. G. OLIVER	Poultry Clubs.
E. H. MATHEWSON	Tobacco Investigations.
C. R. HUDSON	Farm Demonstration Work.
T. E. BROWNE	Assistant in Charge of Boys' Clubs.
W. A. K. ROBERTSON	Assistant in Boys' Clubs.
MRS. JANE S. MCKIMMON	Assistant in Charge Girls' Clubs.
MISS M. L. JAMISON	Assistant in Home Economics.
C. E. CLARK	Assistant Director Edgecombe Test Farm, Rocky Mount, N. C.
F. T. MEACHAM	Assistant Director Fredell Test Farm, Statesville, N. C.
JOHN H. JEFFERIES	Assistant Director Pender Test Farm, Willard, N. C.
S. F. DAVIDSON	Assistant Director Buncombe Test Farm, Swannanoa, N. C.
E. G. MOSS	Assistant Director Granville Test Farm, Oxford, N. C.
J. E. DAVIDSON	Assistant Director Transylvania Test Farm, Blantyre, N. C.

*Assigned by the Bureau of Soils, United States Department of Agriculture.

†Assigned by the Bureau of Animal Husbandry, United States Department of Agriculture.

‡In cooperation with Bureau of Plant Industry, United States Department of Agriculture.

LETTER OF TRANSMITTAL

RALEIGH, N. C.

Hon. W. A. Graham, Commissioner of Agriculture.

Sir: I submit herewith manuscript on Pruning, by Mr. B. Szymoniak, Extension Specialist in Fruit and Truck Growing. Mr. Szymoniak works in the Extension activities of the Divisions of Horticulture and Entomology, and this paper has been prepared in this connection and with the view of meeting a large demand for information on the subject of pruning.

Respectfully,

W. N. HURT,
Horticulturist.

Approved:

Commissioner of Agriculture.

PRUNING

B. SZYMONIAK, Extension Specialist in Fruit and Truck Growing.

There is more doubt on the part of orchardists about proper methods of pruning than of any other orchard operation. So many variable factors have to be considered, that it is difficult at times to combine all of them and decide on what is best to do. Climate, seasonal changes, latitude and altitude, soil fertility, purposes for which the trees are grown and the inherent changeable nature of trees are some of the things that influence growth and fruit production and determine how, when and what to prune. In spite of these variable and influencing factors, there are certain fundamental principles which, if followed, may simplify to a great extent and standardize the methods of pruning. The purpose of this bulletin is to explain and demonstrate some of the more important principles.

OBJECTS OF PRUNING.

The maximum annual yield of marketable fruit without devitalizing the trees is the most important object of pruning. Other reasons for pruning are as follows:

1. To train the trees to a desired shape and form in order to facilitate spraying and harvesting the fruit.
2. To distribute the branches to admit air and sunlight.
3. To regulate wood growth and fruitfulness.
4. To correct undesirable habits of growth.
5. To cut out interfering branches.
6. To control insects and diseases.

PRINCIPLES OF PRUNING.

Pruning is a method of bud selection, permitting the desired buds to grow and eliminating undesirable ones. In order to follow the reasons for pruning, it is necessary to be able to recognize the different kinds of buds and the kinds of growth produced on the trees. There are four kinds of buds that are important in relation to pruning, and four kinds of growth. The four kinds of buds are as follows,—fruit buds, leaf or wood buds, terminal buds and adventitious buds. The four kinds of growth are growth in length, lateral growth, root growth and the growth produced in healing of wounds. The growth produced in healing of wounds is influenced by the methods of pruning and the condition of the trees. The buds are formed on different kinds of growth on different varieties and species of trees. The apple, pear and American and European plums form their fruit buds on short twigs or spurs which require two or more years of growth. Peach and Japanese plum trees produce fruit buds on the current season's growth, usually in the form of long whips. The peach, pear and grape readily produce new growth from old wood; this growth is produced from

invisible buds known as adventitious buds. Apples and cherries do not form new growth very easily from old wood, because of lack of adventitious buds, nor do they heal over the wounds quickly. For this reason peach, pear and grape can be pruned more severely than apple and cherry.

The branches of a tree grow in two directions; length growth from terminal buds and lateral growth from auxiliary leaf or wood buds. Peach and pear trees produce length growth more easily than apple and cherry trees. For this reason it will be necessary to correct the habit of the peach and pear trees of producing too much length growth by cutting back the long whips. On apple and plum trees new growth can be induced to form by cutting out some of the older wood. Cherry trees grow to a symmetrical form naturally and do not require much pruning except the cutting out of injured, diseased or interfering branches. Lateral growth usually develops into fruit bearing wood, while terminal buds form wood growth. It should be the purpose of the pruner to properly balance length growth and lateral growth. Sometimes it is impossible to regulate the growth by pruning back the branches. Injury may result by heavy pruning, especially those trees producing strong succulent growth. This is particularly true of pear trees. The growth of the branches is proportional to the growth of the roots. If pruning the branches fails to correct the habit of producing too much wood growth, root pruning may be resorted to. Pear trees should not be pruned heavily in the winter time, because winter pruning stimulates wood growth. The pear should be pruned in the summer time because summer pruning checks wood growth and induces fruitfulness. Summer pruning should also be followed as a means of controlling fire blight. By cutting out the diseased branches as soon as affected, the destructiveness of the blight can be checked. In pruning the branches care should be exercised not to leave stubs (Fig. 1) because these seldom heal and they subject the trees to the attacks of blight, rot and other canker diseases. The branch on a tree should be pruned close to the place of attachment so that the wound may heal as quickly as possible. Large wounds on pear and apple trees should be disinfected with bichloride of mercury, using one tablet to one pint of water. This will make a solution of one to one thousand. The disinfectant can be bought cheaply at any drug store, where directions for handling the poison will also be given.

A coat of paint made in the form of thick paste of white lead and linseed oil should be applied to the wound immediately after disinfecting. Even better results will be obtained if a paint of $\frac{2}{3}$ parts coal tar and $\frac{1}{3}$ part creosote oil be applied to the wounds. Besides keeping in mind the above stated principles of growth, and observing them in his pruning operations the pruner will have to use his judgment as to what is the best procedure in the general pruning of young and old trees.

BEST TIME TO PRUNE.

A general rule is to prune whenever the knife is sharp. Winter pruning induces wood growth and produces an invigorating and stimulating effect on the growth of the tree. Summer pruning checks wood growth and stimulates fruitfulness. It should also be done to regu-

late water sprout formation and to control diseases. Water sprouts should be pruned in summer time, cutting them out as soon as they form. Diseased branches should be cut out as soon as possible at any time during summer as well as winter. The time of pruning will also be governed by convenience in relation to other work. It may be more convenient to prune in the fall, winter or early spring before sap begins to flow. Plants that may be injured by loss of sap should be pruned as soon as leaves drop in the fall; this should be practiced with all species of grapes, especially the Muscadines. The most important thing to do in pruning is to follow a systematic schedule of pruning every year. Beginning at the time of planting the trees, gradual, annual pruning should be practiced. Sudden severe pruning produces water sprouts and destroys the balance between wood growth and fruitfulness. The bearing habit of old trees depends on care in handling and pruning of the young trees before they come into bearing. It is impossible for trees to produce fine fruit, heal large wounds and combat diseases all at the same time. The natural function of the tree is to produce seed. The extra task of developing the edible part of the fruit has to be supplemented by proper handling and pruning of the trees. The development of the fruit-bearing habit of trees depends on the care given when they are young.

PRUNING TOOLS.

The orchardist should be provided with good pruning tools. This does not mean that every kind of "patent" tool found on the market should be experimented with, nor does it mean that the axe or hatchet should be used for pruning. For young trees and vines, a good handy

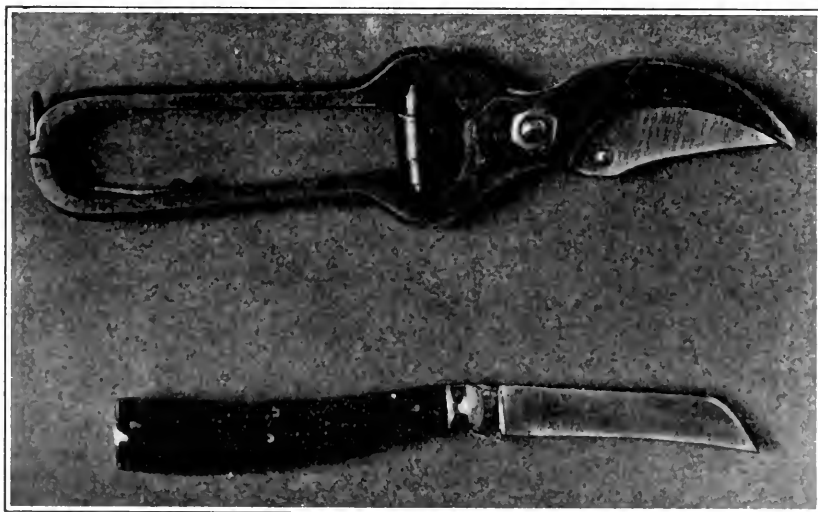


FIG. 2.—Pruning Shear.

FIG. 3.—Pruning Knife.

There are a number of types of pruning shears, but only the very best should be procured, so that the best work can be done.

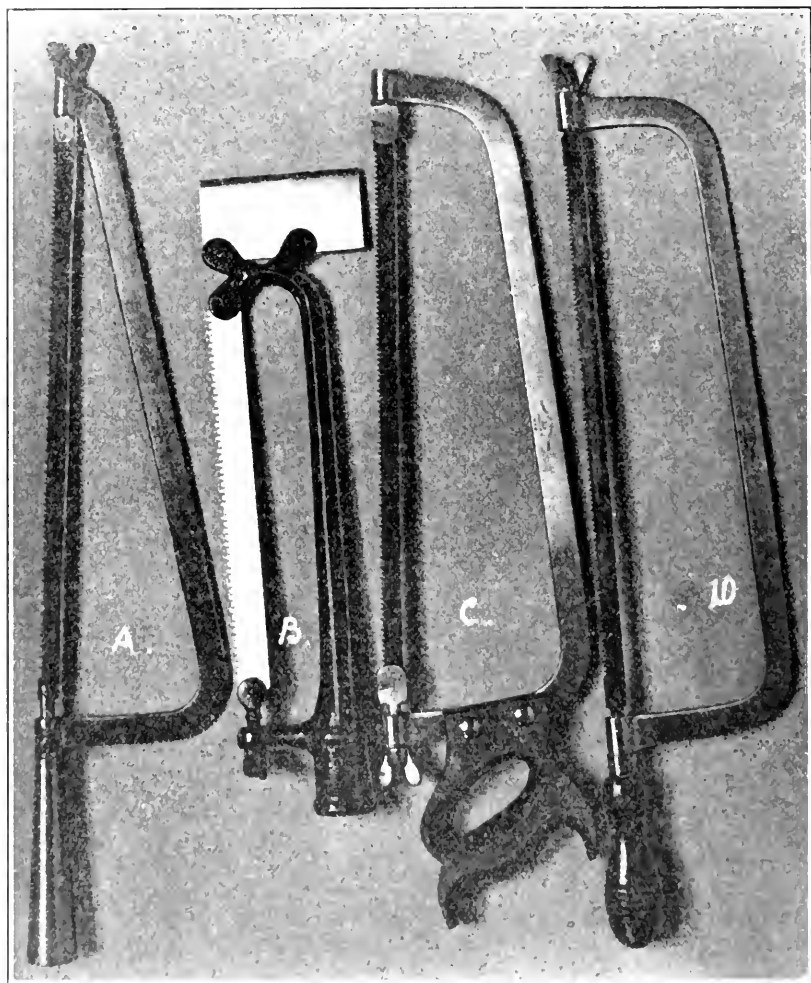


FIG. 4. Swivel Pruning Saws.

These are made at factory for pruning smaller branches. The blades can be adjusted to follow to the main trunk of the tree. The blades are sharp and narrow and cut very easily.

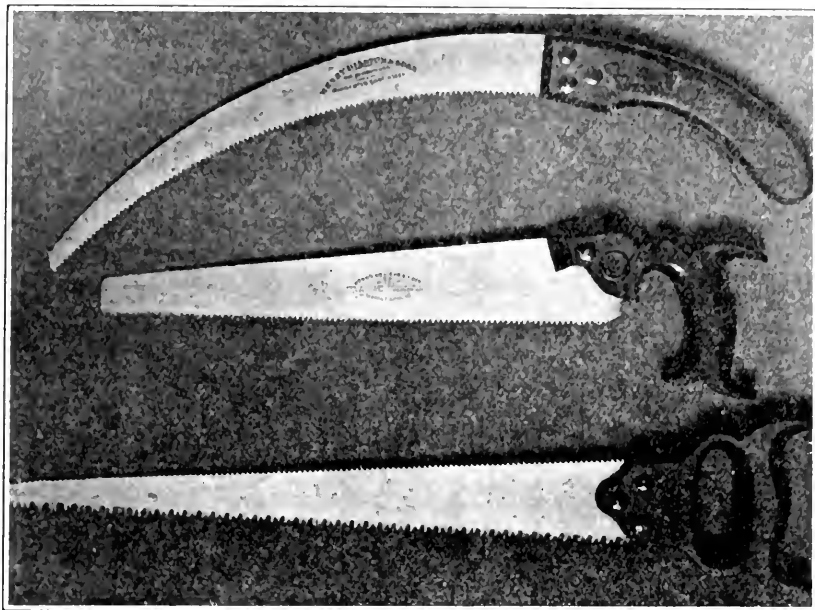


FIG. 5.—Types of Pruning Saws.

The curved saw and the double-edged saw are undesirable; the one shown in the center is satisfactory for larger branches.

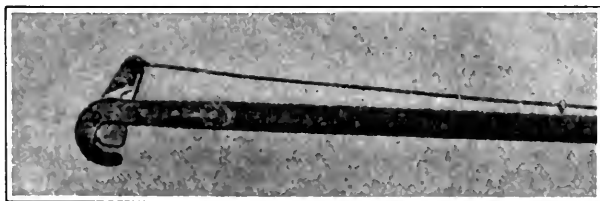
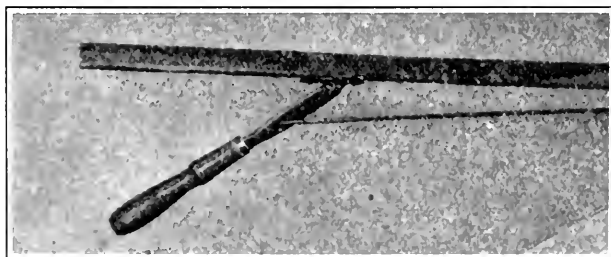


FIG. 6.—Pole Pruner

This pruner is used in cutting back the long growth on the ends of the branches, where it is difficult to reach the sprouts with small hand pruners.

pruning shear (Fig. 2) and a pruning knife (Fig. 3) will serve the best purpose. For older trees, the types of pruning saws, as shown in (Fig. 4) are of advantage. For larger branches the saws shown in (Fig. 5) will be necessary, and should be used instead of a carpenter's hand saw. For pruning peach trees, a pole pruner of the kind shown in (Fig. 6) will do good work. The danger of using long-handled pruners of any kind is that the pruner is likely to become careless and leave stubs and thus injure the trees. Pruning should be done carefully and the branch cut off smoothly, close to the main branch or trunk of the tree. This can best be done with short-handled pruners adapted to size of branch, hardness of wood and kind of tree or vine pruned.

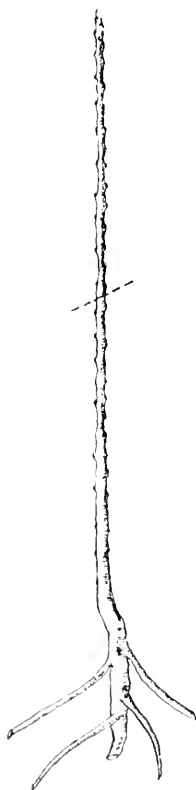


FIG. 7.—One-year-old apple tree, to be cut back to two feet in height as indicated by dotted line.

PRUNING THE APPLE.

Pruning should begin when the apple tree is one year old. The straight stem (Fig. 7) without any side branches is cut back at time of planting to a height of two to three feet. This will give a low headed tree that can be handled properly later. The tree should not be headed too low, as it is difficult to take care of the soil around the

tree when the branches are too close to the ground. The branches should not be headed too high because it will be difficult to prune and spray the trees and gather the crop if the branches are out of reach. A height of about two or three feet will give best results.

During the first growing season, all the growth should be removed as soon as formed except four or five shoots. These shoots should be allowed to grow so as to form the main branches which should be spaced four to five inches apart on the main stem. Branches that are exactly opposite should not be allowed to form because of danger of splitting when the trees come into bearing.

PRUNING A TWO-YEAR-OLD APPLE TREE

Pruning a two-year-old tree consists of properly distributing and training the branches to a desired shape and form. There are two main systems of training apple trees: the central leader or pyramid

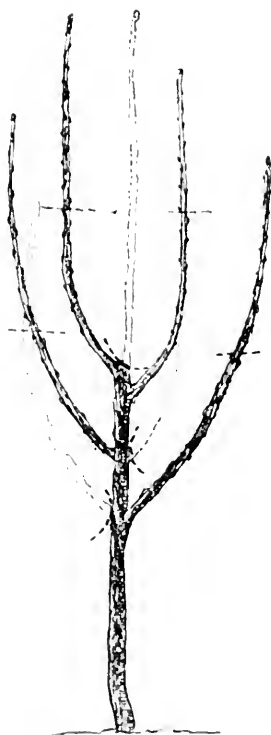


FIG. 8.—Two-year-old apple tree. Cut out the central leader and water sprouts and prune as indicated by dotted lines. Cut back the long whips from 1-2 to 1-3 the length. Do not allow opposite branches to form. Dotted lines indicate what should be pruned. Pears, plums, and cherries are pruned in the same way at this age.

and the open head or vase form; both of these systems are sometimes exaggerated. For North Carolina conditions a combination of the two systems will give best results; a round headed tree with partially open center is the most desirable.

A two-year-old apple tree is pruned by cutting out the central growth and cutting back the side branches to a length of twelve to fourteen inches. If the variety is of the upright, compact, growing nature, the side branches should be pruned to an outside bud to correct the compact habit of growth and induce the branches to spread. If the variety is of the scraggly and drooping kind, the form can be somewhat corrected by pruning to an inside bud. (See Fig. 8). Prune off all unnecessary growth produced on the main stem except four or five branches intended for the head of the tree.

PRUNING A THREE-YEAR-OLD TREE.

The growth on a three-year-old apple tree is all length growth, so that the pruning will be much like that of the two-year-old tree. Cut out all water sprouts on the main stem and side branches. Leave only two or three branches on each main side branch and cut back the length growth from one-third to one-half. (See Fig. 9.)

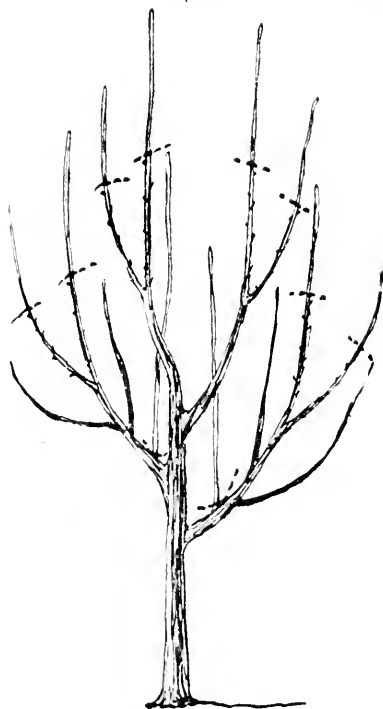


FIG. 9.—Three-year old apple tree. Cut out central leader and inside interfering branches. Prune length growth to 12 or 14 inches, leaving an outside bud at the end of pruned twig. Dotted lines indicate where pruning should be done.

PRUNING THE FOUR-YEAR-OLD TREE.

A four-year-old apple tree will make two kinds of growth, length growth from the ends of the pruned branches and lateral growth in the form of short spurs at the base of the previous season's growth. These spurs will later develop into fruit spurs. If the young trees

have not been pruned up to this time, there will be too much length or wood growth and no spur formation. The principle in pruning young trees is to regulate wood growth so as to develop fruiting spurs. The long shoots at the ends of the branches should be cut back one-half or one-third of the growth, cutting out water sprouts and thinning branches that are too close. Leave only two or three branches or sprouts on the ends of last year's growth and cut the sprouts back to an outside bud or inside bud as the case may require. The five, six and seven-year-old trees are pruned in the same way (Fig. 10). The length growth is cut back and thinned out, and all unnecessary growth in the form of water sprouts on the main trunk and base of main branches is removed. Fruit spurs should not be allowed to form at the base of the main branches and trunk of the tree because of the danger of pear blight getting into the growing tissues. The general plan of pruning from this time on will be to preserve a symmetrical form, to check unnecessary wood growth, encourage the formation of fruit spurs, and to cut out diseased, injured or interfering branches.

PRUNING OLD APPLE TREES.

In pruning old trees care should be taken not to prune too severely. Cut out the middle branches first; next year, the branches forming the sides of the tree may be pruned out, provided they are too thick and interfere with one another. Sometimes all that will be necessary will be to cut out the central branch. This branch is usually too tall and out of reach for spraying and harvesting the fruit and serves as an umbrella shading the lower and more desirable branches. By cutting out the central leader, air and sunlight can penetrate the branches of the tree, spraying can be done more effectively and the height of the tree will be lowered so that the fruit can be gathered more easily. The fruit will also be of larger size and finer color. Care should be taken that too much wood is not taken out because of danger of sun scald. If the branches of old trees are a tangled mass of growth, the old wood should be pruned out, leaving the newer growth. This will prevent the formation of too much water sprout growth. The water sprouts should be removed in the summer time during the growing season. The main idea in pruning old trees is to replace the old branches with new ones. This can only be done by gradual pruning every year. Dead, diseased and interfering branches should be pruned out, care being taken not to leave stubs on the trees. The large wounds should be cut smoothly and close to a side branch or the main trunk. The trees should not be injured by allowing the branches to break and peel off the bark. The wounds should be disinfected and painted over.

The best disinfectant is a solution of bichloride of mercury, one tablet ($7\frac{1}{2}$ grains) to one pint of water. This should be applied immediately after the branch is cut off. Care should be taken in handling the bichloride, as it is a poison and will corrode metal, clothes and hands. White lead and linseed oil made into a thick paint may be used, but better results will be obtained with a paint made of two-thirds part coal tar and one-third part creosote oil. The tar creosote paint is a powerful disinfectant and actually prevents rotting of the wood, while the white lead paint is not so effective.

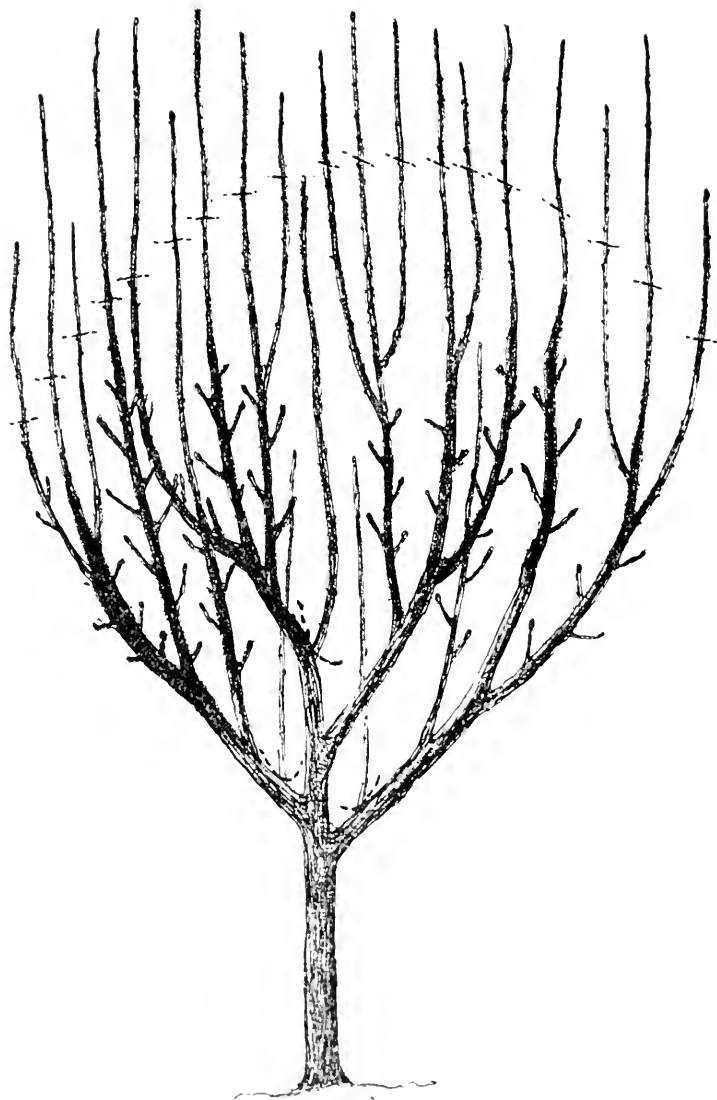


FIG. 10 — Five-year old apple tree. Notice length growth in the form of sprouts on the ends of branches and lateral growth in the form of spurs at base of branches. Prune as indicated by dotted line, cutting out central leader, water sprouts and ends of new growth to an outside bud. Prune six and seven-year-old trees in same way. Fruit will develop on spurs the sixth or seventh year.

PRUNING THE PEAR TREE.

The pear tree is pruned to check the succulent wood growth and to control blight. The training and shaping of the young tree is the same as that of the apple tree. After the pear tree becomes six or eight years old not as much winter pruning will be necessary and more summer pruning should be given. The heavy succulent growth is due to strong root growth. It may be advisable to prune the roots during the winter rather than the branches. This is done by exposing the root system in the winter time and cutting one of the main roots with an axe, leaving the part cut off in the soil. Water sprouts are removed during growing season.

The wounds on pear trees should always be well disinfected with bichloride solution immediately after the branch is cut off. It is more important to disinfect the wounds than to disinfect the tools. Every precaution should be taken not to infect the wounds with the blight disease by improper pruning. The wounds should also be painted over with the tar creosote paint mentioned above for apples. All fruit spurs on main trunk and lower parts of main branches should be removed. Prune in the winter to cut out blight cankers and in the summer time to check spread of blight disease. Dead, diseased and interfering branches should be pruned out at any time of the season.

PRUNING PEACH TREES.

The peach, like all other fruit trees, requires annual and thorough pruning from the time of transplanting. The growth is more vigorous and free from diseases. For this reason, the large amount of wood growth produced will require more severe pruning. The fruit buds are borne in pairs on long whips formed the previous season. These whips or shoots grow out on the ends of previous season's branches. If peach trees are neglected and not pruned, all the fruiting whips will be produced on the ends of long branches. The lower branches will be shaded by branches above forming long top-heavy branches which will break off when a crop of fruit is borne. This habit of the tree can be corrected by cutting off the ends of the new shoots and cutting out the growth in the center of the tree to admit air and sunlight in order that shading and crowding of the branches may be prevented. The peach twigs require sunlight for best development; for this reason an open head should be the plan of pruning peach trees.

PRUNING ONE-YEAR-OLD PEACH TREES.

Peach trees should be headed low enough to permit the examination of the base of the trunk for borers and to enable the cultivation of the trees. The tendency to produce tall growth should be checked by cutting off the length growth and heading the tree at proper height of about eighteen inches from the ground.

The pruning at time of transplanting should consist of cutting out the central branches and cutting out all unnecessary growth on the main stem except four branches. These branches are spaced three or four inches apart and are cut back to short spurs two or three inches long as shown in diagrammatic illustration (Fig. 11). These spurs

should be left on the main stem in such a way that two will extend in opposite directions, north and south, and the other two, east and west. The spurs should contain two opposite buds.

PRUNING TWO-YEAR-OLD PEACH TREES.

The pruning of the peach tree the second year should consist of cutting out the central branches and water sprouts on the main stem and

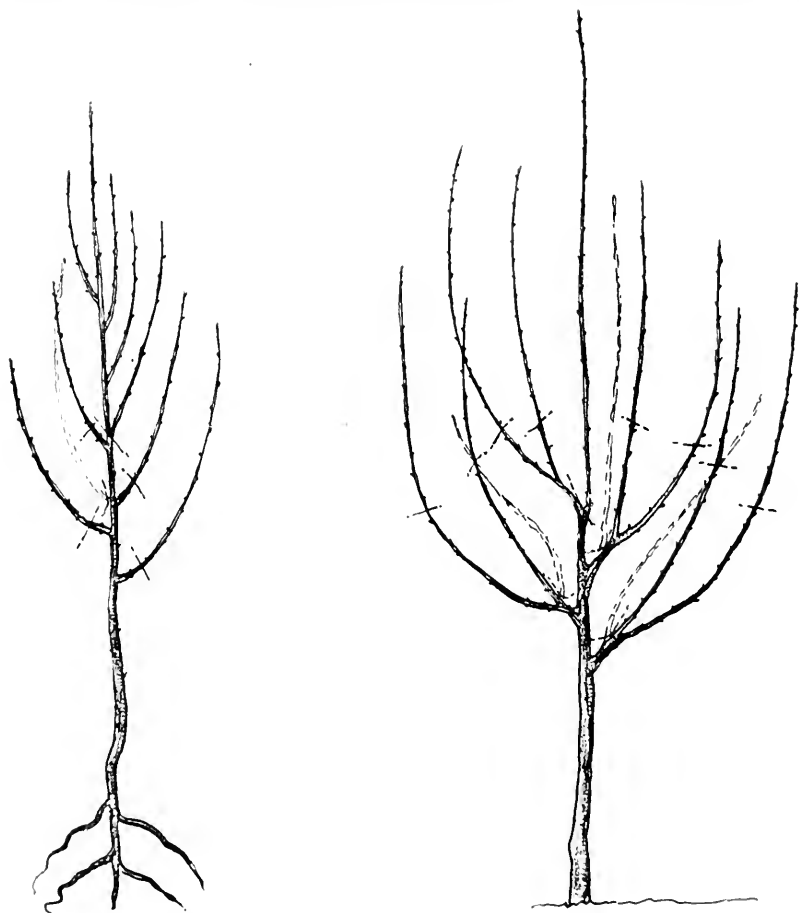


FIG. 11.—One-year old peach tree. Cut out central leader, leaving four branches pruned to spurs 2 inches long, as indicated by dotted lines. Do not allow opposite branches to form.

FIG. 12.—Two year-old peach tree. Cut out central growth in form of sprouts and cut back length growth to 1-2 as indicated by dotted lines.

leaving two sprouts on each spur of the previous season (Fig. 12). These sprouts are cut back to a length of twelve or fourteen inches and pruned to an outside bud, so that an open head may be formed. Prune well above the buds, so that they may not be injured by the wound drying out.

PRUNING THREE-YEAR-OLD PEACH TREES.

The peach tree will begin to form fruit buds the third or fourth year after transplanting. These fruit buds are borne in pairs and are usually located in the middle part of the twigs. The leaf or wood buds are produced at the base and ends of the twigs and are arranged spirally. The pruning should consist of cutting off the ends of the shoots to prevent the wood buds from producing too much length growth, so as to enable the buds at the base to make the new fruit bearing growth for next season (Fig. 13). By this plan the tree will be kept to a

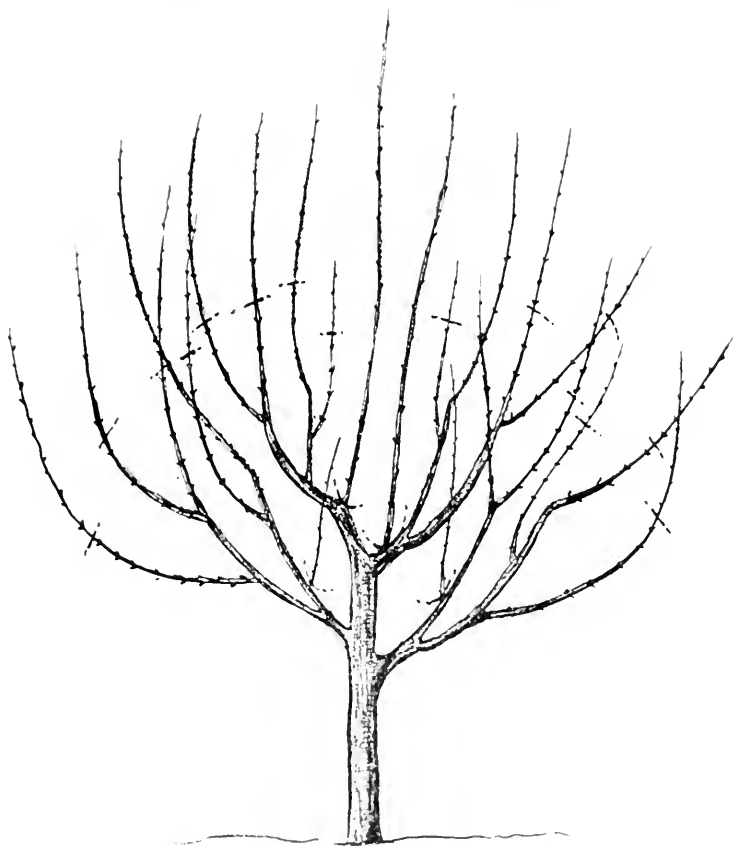


FIG. 13.—Three-year-old peach tree. Notice the buds on the peach tree, single buds at ends of twigs and double buds at base. Prune the ends of the new growth to 12 or 13, cut out central leader and interfering growth to open center of the tree. The peach tree bears fruit on new growth beginning the third year. The double buds develop into fruit. Prune with this in mind in subsequent years. The dotted lines indicate where pruning should be done.

limited height and the fruit will be closer to the main branches so that there will be less danger of the branches breaking from a heavy crop. The fruit also is not so liable to be blown off by the wind.

After peach trees become four and five years old the pruning will be the same as of the three-year-old trees except that there will be more

branches to prune. The old wood is pruned out so as to allow new growth to form. The new shoots are cut back one-third to one-half, and where they may be too crowded, the shoots are thinned out. The center of the tree should be kept open so as to admit air and sunlight, which helps to produce good color and size of the fruit. Dead, diseased, injured and interfering branches should be cut out.

PRUNING OLD PEACH TREES.

If peach trees have been badly neglected by lack of pruning they may be renewed by judicious cutting off or dehorning of the branches. Peach trees produce new growth very readily from adventitious buds on old wood. For this reason little or no harm is done by severe pruning; and in case the buds are injured by a late frost, dehorning should be resorted to, so that the trees may better be able to produce fruit bearing growth for next season.

The dehorning consists in cutting the long branches to stubs two or three feet in length. These stubs will produce new shoots which will bear fruit the following season. Wounds on peach trees heal very quickly, but care should be taken to paint the wounds with tar creosote paint to prevent the rotting of the heart and sap wood. Later pruning will be to cut the sprouts back to one-half or one-third and to thin out crowded and interfering growth, keeping the centers of the trees open.

PRUNING CHERRY TREES.

Young cherry trees are started in the same way as apple trees, except that not as much pruning will be necessary. The cherry tree naturally forms a symmetrical head so that very little training of the tree will be required. After the tree becomes older very little pruning should be given. However, it may be necessary to remove just enough wood to prevent branches from interfering and to cut out diseased and injured parts. Large branches should not be removed because the wounds on old wood do not heal very readily, so that there may be danger of the wounds drying out and injuring the trees. The old wood cannot be renewed by pruning like the peach, pear or apple trees because cherry trees do not form adventitious buds on old wood.

PRUNING PLUM TREES.

As with all fruit trees, the pruning should begin with the young trees. The object of pruning young plum trees is to train the trees to a low headed form with a partially open center. The Japanese plums should be pruned much like peach trees; the European and American plums should be pruned according to the directions given for apple trees. After the trees become of bearing age, they will need very little pruning. Dead, injured and interfering branches should be removed.

PRUNING GRAPES.

The grape is the easiest of all fruit plants to prune. The principal reasons for pruning the grape are to keep the vine in due bounds and to prune for fruitfulness by cutting out all unnecessary wood growth.

Grape vines should be pruned in the fall or early winter, because there is danger of loss of sap if the vines are pruned late in the winter or just before sap begins to rise.

There are two general systems of training grape vines, the upright and the drooping systems. The drooping or Kniffin System is probably best for conditions in North Carolina. This system consists in training the vine to a main stem with four arms on two wires, the lower wire 3 feet from ground and the upper one 2½ feet above the lower. The fruit is borne on shoots produced on canes coming from two-year-old wood.

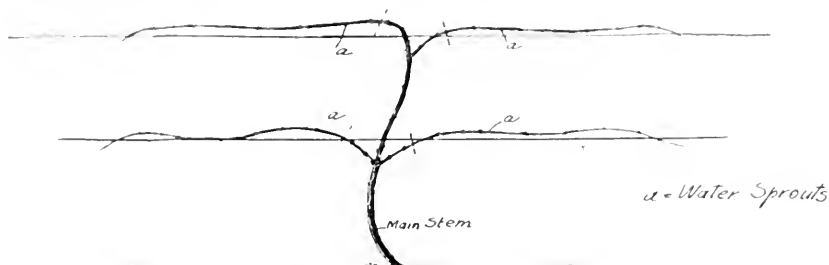


FIG. 14.—Grape vine. First season's growth after planting. Main stem with four arms in form of water sprouts, trained to two wires. In fall or winter prune the sprouts to spurs of two nodes long as indicated by dotted lines.

PRUNING THE FIRST YEAR AFTER PLANTING.

The grape vine ought to produce a main stem and four arms in the form of water sprouts the first season. These sprouts are cut back to short spurs two joints or nodes in length. If more than four sprouts are produced, they should be cut off close to the main stem, leaving only four close to the wires. (See Fig. 14.)

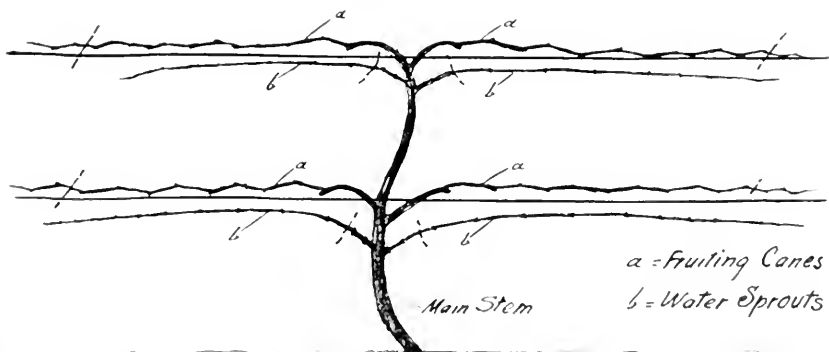


FIG. 15.—Grape vine. Second season's growth after planting consists of fruiting canes for next year, and water sprouts on main stem. Notice the fruiting canes are more zigzag and have shorter nodes or joints than the water sprouts. Prune the sprouts to spurs two nodes long, as indicated by dotted lines. Cut the ends of the canes to a desired length.

The second year after planting (See Fig 15) the grape vine will make fruiting canes from the spurs left last season. Only one cane should be left on each spur. The main stem will also produce a num-

ber of water sprouts. The pruning will consist of cutting back the water sprouts to spurs two nodes in length. If more sprouts are present, they should be cut off close to main stem.

The growth of the grape the third season (See Fig. 16) will consist of water sprouts on main stem, fruiting canes on spurs and fruit on shoots produced on last season's canes. The vine is pruned by cutting out all unnecessary water sprouts, leaving two to each wire; these water sprouts should be cut back to spurs two nodes in length. The old fruiting canes are cut out entirely. New fruiting canes produced on spurs of last season should be left to bear fruit the following season. The fruiting canes have shorter nodes and more mature buds than the water sprouts which produce a long succulent growth. This method is repeated the successive and following years.

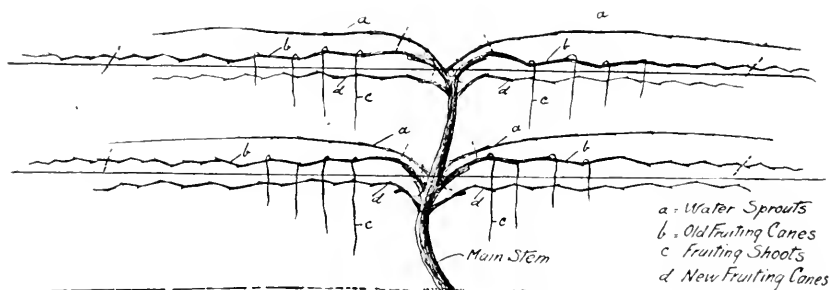


FIG. 16.—Third season's growth after planting consists of fruit bearing sprouts produced on fruiting canes, water sprouts on main stem, and fruiting canes for next season on water sprout spurs. After gathering fruit, prune in fall or winter, cut out the old fruiting canes and cut back the water sprouts to spurs two nodes long and new canes to desired length as indicated by dotted lines.

PRUNING MUSCADINE GRAPES.

The Scuppernong and other varieties of Muscadine grapes make a very vigorous and luxuriant growth. For this reason they are better adapted to training on an arbor or overhead trellis. They may be trained, however, to the Kniffin System the same as the bunch grape, except that six arms on three wires are allowed to form instead of four as with the bunch grapes. These arms should also be much longer so as not to reduce the fruiting capacity of the vine.

In training Muscadine grapes only one branch should be allowed to grow for the main stem. (See Fig. 17).

The arbor or overhead trellis can be made of any durable timber. Four posts are placed around the vine and properly braced to make a substantial support for the vine. Rails, woven wire fencing or galvanized pipes can be used on which the vine may be trained. Single strands of wire on such an arbor should not be used because it is difficult to keep them uniformly tight. The vines should be pruned as soon as the leaves drop in the fall. Annual pruning should be practiced. Sudden severe pruning is liable to injure the vines.

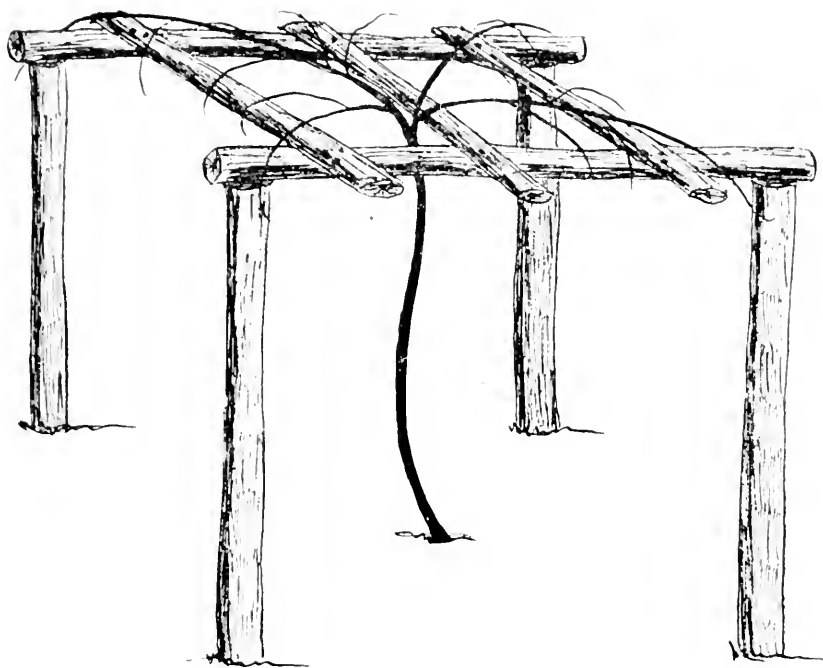


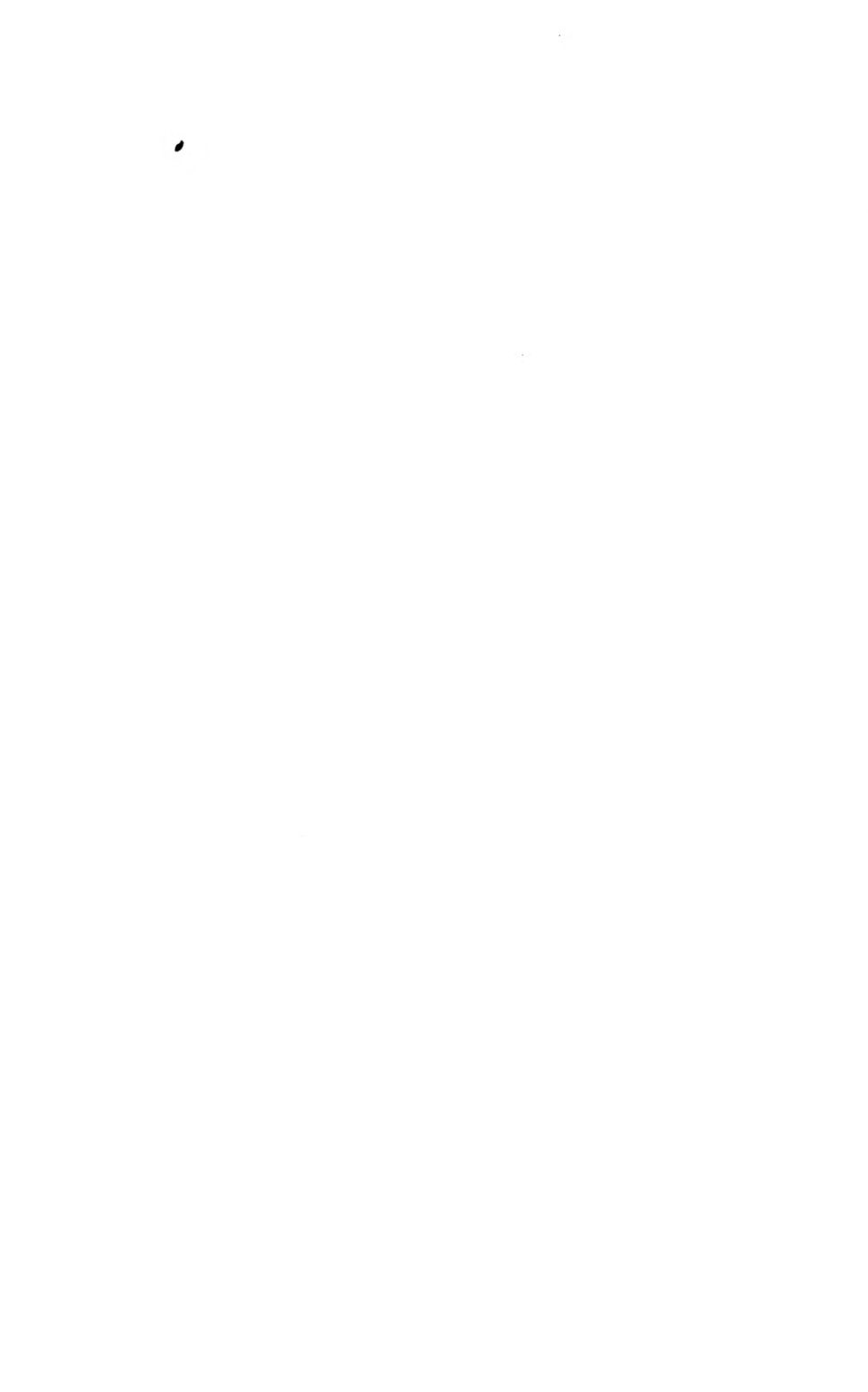
FIG. 17.—Muscadine grape, trained on an arbor.

LEAF TOBACCO SALES FOR MAY. 1916.

Pounds sold for producers, first hand.....	281,215
Pounds sold for dealers.....	27,363
Pounds sold for warehouses.....	79,395
	<hr/>
Total	387,973

LEAF TOBACCO SALES FOR JUNE. 1916.

Pounds sold for producers, first hand.....	83,598
Pounds sold for dealers.....	16,146
Pounds sold for warehouses.....	776
	<hr/>
Total	100,520



THE BULLETIN
OF THE
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE
RALEIGH

Vol. 37, No. 8

AUGUST, 1916

Whole No. 223

FARM WEEDS OF NORTH CAROLINA
AND
METHODS FOR THEIR CONTROL

NUMBER 1

PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Postoffice at Raleigh, N. C., as second class matter,
February 7, 1901, under Act of June 6, 1900.

LETTER OF TRANSMITTAL

RALEIGH, N. C., September 20, 1916.

HON. W. A. GRAHAM,

Commissioner of Agriculture,

Raleigh, N. C.

SIR:—I have the honor to hand you herewith a manuscript, with cuts, discussing briefly the most approved methods of eradication and control of seventeen of the leading farm weeds found in North Carolina, and recommend its publication as the August BULLETIN of the Division of Botany and Agronomy of this Department. For the cuts used in this BULLETIN we are indebted to the Michigan Agricultural Experiment Station.

Respectfully yours,

JAMES L. BURGESS,

Agronomist and Botanist.

Approved:

W. A. GRAHAM,

Commissioner.

LEAF TOBACCO SALES FOR AUGUST, 1916.

Pounds sold for producers, first hand.....	13,841,939
Pounds sold for dealers.....	682,605
Pounds sold for warehouses.....	257,037
Total	14,781,581

Farm Weeds of North Carolina and Methods for their Control

BY

JAMES L. BURGESS AND CLARENCE H. WALDRON

INTRODUCTORY

Any plant found growing where the farmer does not want it may be properly called a weed. For example, wheat is a weed when found scattered through the oat fields. Corn is a weed when found in the cotton field, etc. But, as a rule, farm weeds are not economic plants and have little or no value, from the farmer's point of view, regardless of where they are found growing.

Some weeds complete their growth in one year, and are, for this reason, called *annuals*; others require two seasons to complete their growth, and are called *biennials*; still others come from the root each year, or are not killed down to the ground by frosts at the end of the season, and are called *perennials*. Or, to put it differently, annual plants come from the seed each year; biennials every two years; while perennial plants come from the seed but once through a long series of years, as the oaks and other familiar trees.

GENERAL PRINCIPLES OF WEED CONTROL

1. All future generations of weeds that come from seed can be cut off by preventing the parent plants from maturing seeds.

2. All weeds that come from the root, or root stock, each year may eventually be killed by not allowing them to produce leaves.

3. Frequent tillage of cultivated fields, and frequent mowing of meadows and clipping of pastures are excellent means of weed eradication.

4. Sometimes fields must be cleared of growths the stumps of which sprout profusely for several succeeding seasons. The best time to clear such lands is when the trees are in full leaf and just when the growth of the present season has stopped. The roots have then given up to the spring growth most of the food supply stored in them the previous summer and have not had time to accumulate a new supply for the growth of the following spring. *By clearing at this critical time, little or no sprouting from most trees and shrubs need be expected.* Of course, the lifting of the stumps will prevent sprouting, but it is not always practicable to do this.

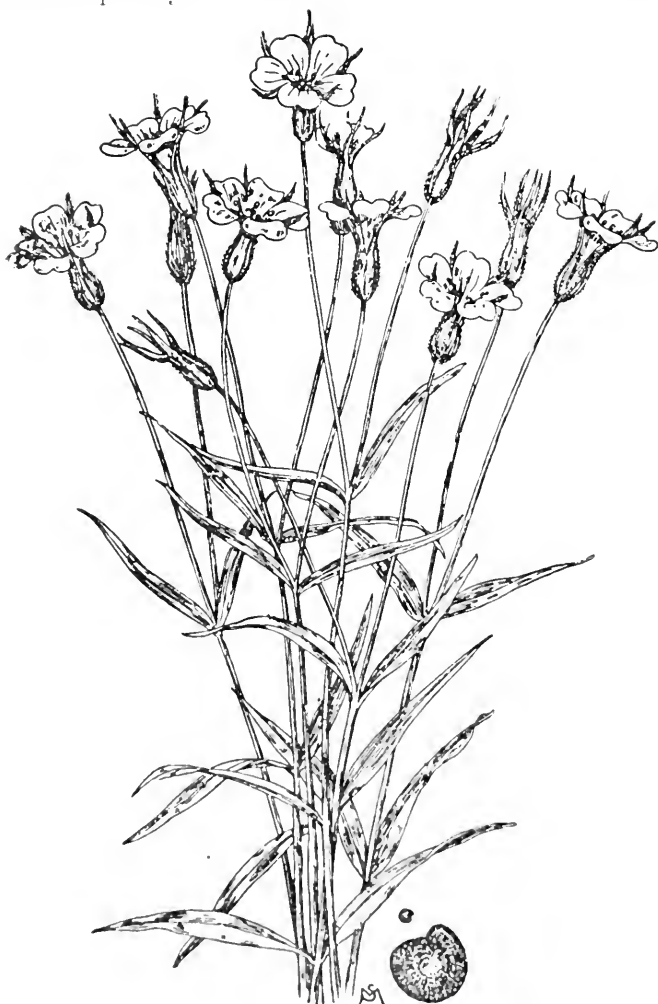
5. Every one is familiar with the practice of clearing land of weeds and chaparral by grazing it with cattle, sheep, and particularly goats.

Corn or Purple Cockle. *Agrostemma Githago L.*

A member of the Pink family. An annual about three feet high, branches few. Entire plant covered with silky hairs. Leaves narrow, two to four inches long. Flowers showy, rose-purple, an inch or more wide. Petals five. Calyx ridged, swollen at maturity. Seeds large, black, roughly triangular, covered with rows of coarse teeth. A weed in wheat fields. The seed is injurious to flour. Throughout the State. June to September.

CONTROL

Sow only clean seed wheat, oats and rye. Hand-pull all cockle plants found growing in the grain fields. Practice clean cultivation on infested fields, and see that no cockle plants mature seed. This plant is listed among the poisonous plants of America, and any large amount of the seed in wheat renders the flour unsafe for human food; and wheat tailings or screenings containing an appreciable amount of cockle are said to be unsafe feed for poultry.



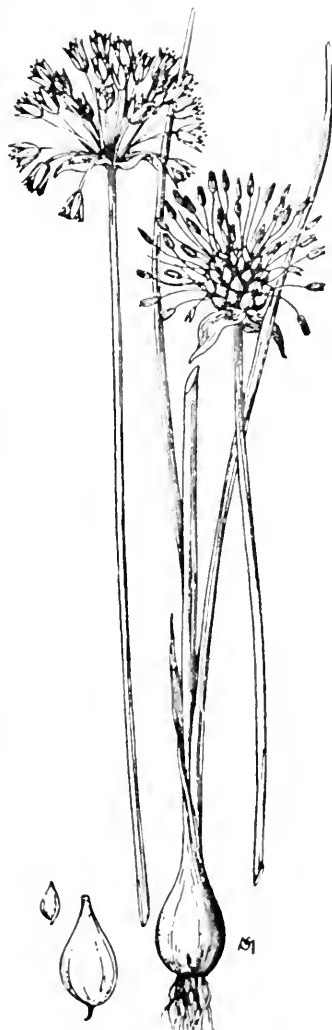
NO. 1 CORN OR PURPLE COCKLE OR AGROSTEMMA GITHAGO L.

Wild Onion. *Allium vineale* L.

Other names are Field Garlic or Wild Garlic. This plant is a member of the Lily family, and bears during June and July a cluster of small purple flowers at the summit of a naked stem about two feet high. Leaves long and slender, produced at the base of the stem, which terminates in a small bulb of the onion type. Seeds are not produced, and the plant increases principally by means of bulblets which are produced among the flowers. Found everywhere, and particularly in pastures, where it is objectionable to stock owners, as it ruins the flavor of milk. Flour made from wheat containing the bulblets is unfit for use.

CONTROL

Late fall plowing and early spring cultivation are recommended. While the bulbs form under ground as a normal method of propagating the plant, these bulbs cannot continue to grow very many seasons if the above-ground portion of the plant is persistently destroyed either by cultivation or grazing. Late fall plowing, therefore, when the tops have attained a height of six to eight inches, will greatly weaken if it does not entirely destroy the fall growth; and the early spring stirrings of the soil, after the spring growth of the onions has put up some inches, will go a long way toward killing the spring crop of left-over bulblets. Follow these fall and spring stirrings of the soil by thorough, clean, summer cultivation for two or three years, and the onions will be under pretty good control. Pasturing with sheep, goats, and beef cattle—never with dairy cattle—is very helpful in the control of this weed. Sow clean seed wheat and oats, as another helpful remedy.



NO. 2. WILD ONION OR
ALLIUM VINEALE L.

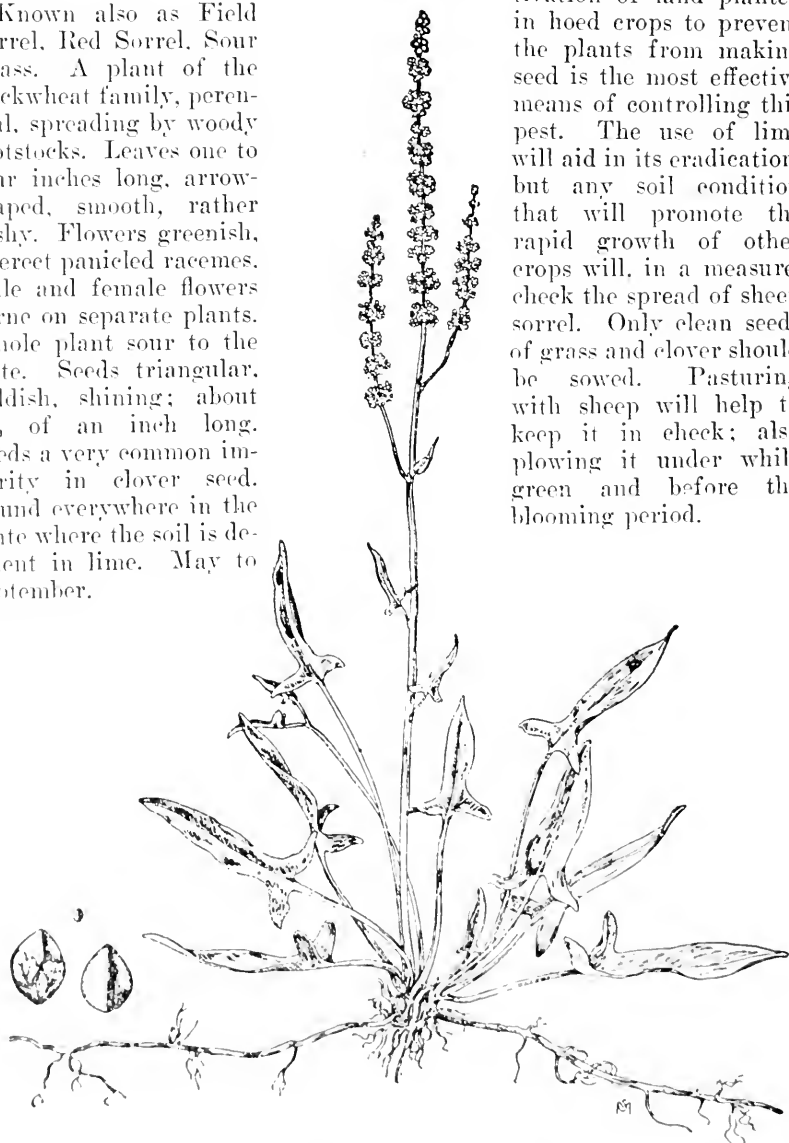
Sheep Sorrel.

Rumex acetosella L.

Known also as Field Sorrel, Red Sorrel, Sour Grass. A plant of the Buckwheat family, perennial, spreading by woody rootstocks. Leaves one to four inches long, arrow-shaped, smooth, rather fleshy. Flowers greenish, in erect panicle racemes, male and female flowers borne on separate plants. Whole plant sour to the taste. Seeds triangular, reddish, shining; about $\frac{1}{20}$ of an inch long. Seeds a very common impurity in clover seed. Found everywhere in the State where the soil is deficient in lime. May to September.

CONTROL

Clean and frequent cultivation of land planted in hoed crops to prevent the plants from making seed is the most effective means of controlling this pest. The use of lime will aid in its eradication, but any soil condition that will promote the rapid growth of other crops will, in a measure, check the spread of sheep sorrel. Only clean seeds of grass and clover should be sowed. Pasturing with sheep will help to keep it in check; also plowing it under while green and before the blooming period.



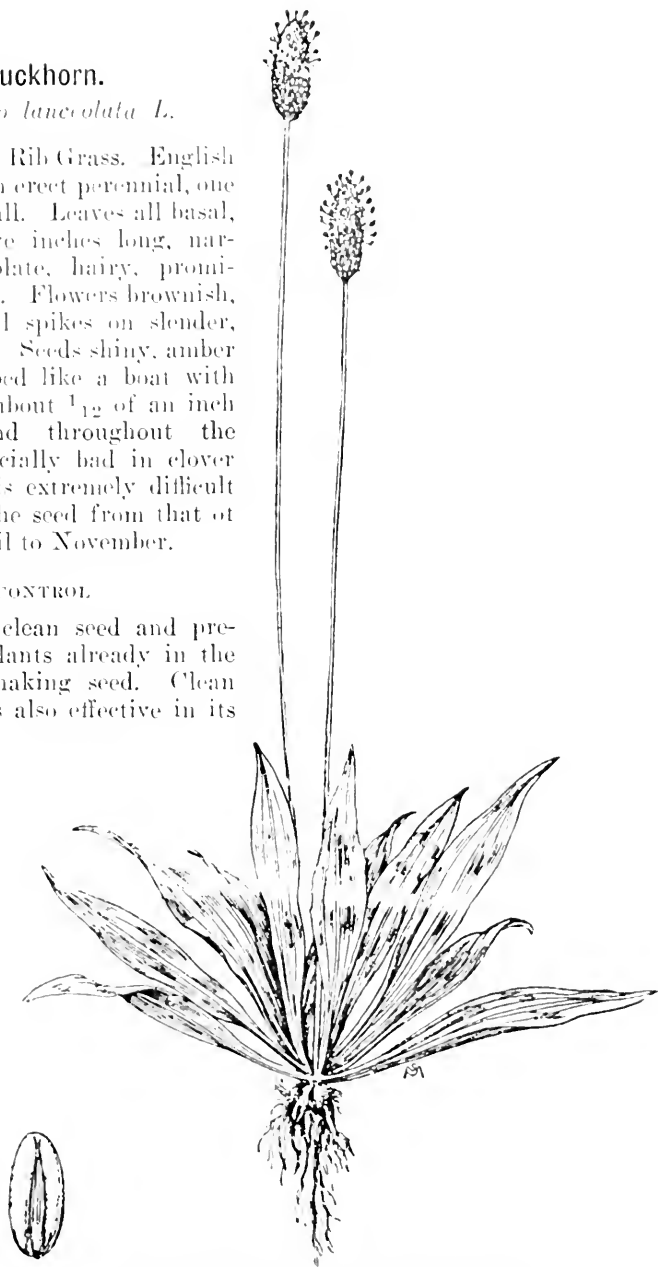
NO 3 SHEEP SORREL OR *RUMEX ACETOSELLA* L.

Buckhorn.*Plantago lanceolata* L.

Also called Rib Grass. English Plantain. An erect perennial, one to two feet tall. Leaves all basal, two to twelve inches long, narrowly lanceolate, hairy, prominently ribbed. Flowers brownish, in cylindrical spikes on slender, naked stems. Seeds shiny, amber colored, shaped like a boat with thick walls, about $\frac{1}{12}$ of an inch long. Found throughout the State. Especially bad in clover fields, as it is extremely difficult to separate the seed from that of clover. April to November.

CONTROL.

Sow only clean seed and prevent those plants already in the field from making seed. Clean cultivation is also effective in its control.

No. 4. BUCKHORN OR *PLANTAGO LANCEOLATA* L.

Large Bracted Plantain. *Plantago aristata* Michx.

A low, dark-green, hairy annual, six to eighteen inches high. Leaves long, slender, all basal. Flowers greenish, borne on slender, naked stems in cylindrical, bracted spikes. Seeds light brown, boat-shaped, marked with a transverse groove on convex side. Introduced from the West. In fields in the eastern and central sections of the State. May to October.

CONTROL

Same as for Buckhorn. Keep it from seedling and practice clean cultivation of fields.



NO. 5. LARGE BRACKETED PLANTAIN OR *PLANTAGO ARISTATA* MICHX.

Field Dodder.

Cuscuta arvensis Beyrich.

Another name is Love-vine. An annual plant, parasitic on clovers and other plants. The seed germinates in the ground, and a stem is sent up which attaches itself to neighboring plants, and the root soon dies, the sole nourishment being gained from the host plant. No leaves are produced, and the stems are bright yellow, slender and twining. The small white flowers grow in clusters along the stem. Seed small, dull brown, round or partly flattened. Found throughout the State, June and August.

CONTROL

This weed pest amounts to a blight in all clover and alfalfa fields, and when once it gets hold it is a most difficult plant to exterminate. The use of absolutely clean seed is the most effective remedy. The cutting and burning of plants attacked, and the plowing under of the crop before the dodder plants have made seed are also effective remedies against its spread. Since the plants come from seed each season any practice that will prevent seeding will kill the pest.



No. 6. FIELD DODDER OR
CUSCUTA ARVENSIS BEYRICH.

Common Chickweed. *Stellaria media* (L.) Cyrill.

A weak, sprawling, much-branched annual. Stems four to sixteen inches long. Plant smooth except for a line of hairs on one side of the stem. Leaves small, ovate. Flowers in leafy cymes, or solitary in the axils of the leaves. Petals very small, white, deeply two-parted. Seeds numerous, very small, reddish brown, roughened. Common everywhere, especially in lawns. March to December, but flourishes especially in moist, cool weather.

CONTROL

This weed has, for a long time, been particularly troublesome in lawns, but of recent years has spread to the hay fields and is literally "taking" many alfalfa fields and choking out the crop. It makes its most rapid vegetative growth when other crops, as alfalfa, clover, and the small grains, are dormant and thus attains an unfair advantage over them in the struggle for existence. This weed pest came to us in imported lawn grass and clover seeds, and was at first an object of curiosity, where it is now, like the English Sparrow, a devouring pest that is well-nigh beyond our control. The seeds of this plant have remarkable longevity and will germinate after having lain in the ground for years.

The use of only clean seeds, clean and thorough cultivation, turning the land before the plants set the flowers, and the use of smothering crops, are among the best known methods of eradication.



NO. 7. COMMON CHICKWEED OR
STELLARIA MEDIA (L.) CYRILL.

German Knot Grass. *Scleranthus annuus* L.

Other names are Knawel and Gravel Chickweed. A very small annual, much branched, rarely over six inches in height, roots long, fibrous and tough. Leaves very small, awl-shaped. Flowers greenish, inconspicuous. A single seed to each flower, included in the hard, dry calyx, which drops off at maturity. Frequently seen in reddish mats close to the ground, in cultivated fields and waste places in the eastern and central parts of the State. Obnoxious in winter cereals. March to October.

CONTROL

This pest is rapidly gaining ground in North Carolina. Imported some years ago in clover and other seeds from Europe, it has now taken such hold in some sections of the State that its eradication will require rather heroic measures. Like chickweed, it acquires its principal growth in early spring when other plants are dormant, and, its seeds being inconspicuous, re-seeds the land profusely before one is aware of it.

Methods of eradication are about the same for this plant as for chickweed. Keep it from seeding, and sow only good, clean seed.



NO. 8. GERMAN KNOT GRASS OR
SCLERANTHUS ANNUUS L.



NO. 9. SPINY OR RED AMARANTH
OR *AMARANTHUS SPINOSUS* L.

Spiny or Red Amaranth.

Amaranthus spinosus L.

A coarse annual plant, growing to about four feet in height. Plant dull green, nearly smooth, stem sometimes red. Leaves ovate to lanceolate, a pair of sharp spines, sometimes one inch long, at the base of each one. Female flowers in dense clusters in the axils of the upper leaves, male flowers in dense terminal spikes. Flowers green. Seeds very small, round, black, highly polished. Throughout the State in gardens, fields, and waste places. June to September.

CONTROL

Hand-pulling is the surest means of control. Clipping in order to prevent seeding will not succeed as the stubble will sprout profusely and make seeds near the ground. Clean cultivation and the use of clean seeds are other means of controlling its spread.

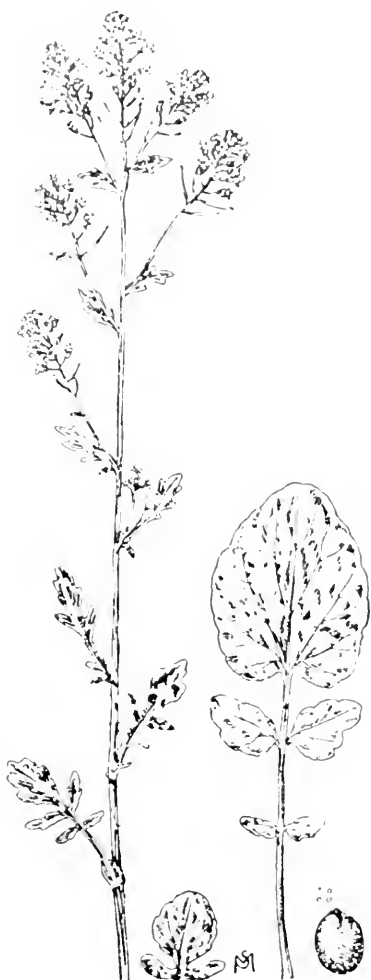
Winter Cress.

Barbarea vulgaris R. Br.

Called also Yellow Rocket. A member of the Mustard family. A smooth upright perennial, growing to a height of about two feet. Lower leaves petioled, pinnatifid, the terminal division much larger than the lateral ones. Upper leaves smaller, sessile. Flowers showy, bright yellow, in racemes. Petals and pods nearly cylindrical, one inch long. Seed slightly roughened, grayish brown, flattened, broadly oval. Occurs in the eastern and central parts of the State. A conspicuous weed of fields and gardens in very early spring. February to June.

CONTROL.

This plant is eaten as greens by many people and makes a most palatable early spring dish. It is generally found on low lands and becomes a pestiferous weed only when these lands are seeded to wheat, oats, clover, or some other uncultivated crop. Hand pulling of small patches, plowing the land before the flower stalks put up, sowing only clean seed, and otherwise preventing the plants from maturing seeds are the leading methods of control.



NO. 10. WINTER CRESS OR
BARBAREA VULGARIS R. BR.

Wild Carrot. *Daucus Carota* L.

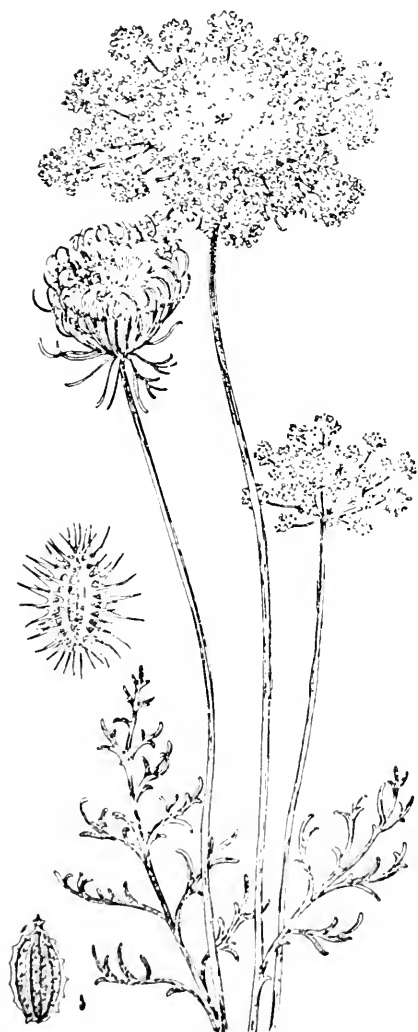
Also known as Queen Anne's Lace or Bird's-nest Plant. A biennial plant. Grows about three feet high, rough-hairy all over. Leaves much divided into narrow lobes. Root fleshy, conical. Flowers small, white, massed together into a large, flat-topped umbel. As the fruit ripens the umbel closes up so as to resemble a bird's nest. Fruit oval, flattened,

having rows of weak spines which are generally knocked off when seed containing it is cleaned. Very common everywhere. It is probably merely the garden carrot escaped from cultivation. June to September.

CONTROL.

This weed is not a very formidable enemy to crop production in this State, and, when in fields which can be pastured, it furnishes a very good forage for certain live stock. It is usually worse in clover fields that are to be mowed for hay or seed. But, since wild carrot is a vigorously growing, tap-rooted biennial plant that soon covers a field and adds a great deal of organic matter to the soil, even where the land is poor, it should be looked upon as a source of soil fertility, particularly on poor lands that can be allowed to lie for a few years, rather than as a weed pest to be gotten rid of.

Since it requires two years before it can make seed, the plowing under of the plant in early spring will prove very effective in its control. The clover fields may be clipped while the plants are in bloom as a partial remedy. Pasturing will also help to keep it down.



NO. 11. WILD CARROT OR
DAUCUS CAROTA L.

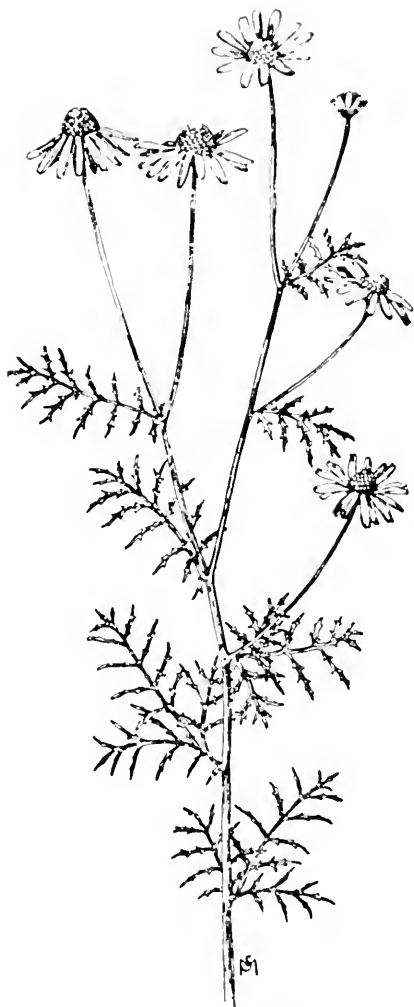
Stinking Mayweed.

Anthemis Cotula L.

Other names are Dog Fennel, Dog's Chamomile. A member of the Sunflower family, closely related to the Daisy. An ill-smelling, much branched annual, one to two feet high. Leaves finely divided. Flower heads white with a yellow center, about one inch wide, rays ten to eighteen. Seeds small, brown, oblong, or obovoid, with ten longitudinal warty ribs. Throughout the State. A vile weed around dwellings, farmsteads and in fields. June to November.

CONTROL

This is a bad weed in pastures, but never bothers the cultivated fields. As it comes from the seed each year, the preventing of seeding will destroy it.



NO. 12. STINKING MAYWEED OR
ANTHEMIS COTULA L.

Yellow Nut Grass. *Cyperus esculentus* L.

A member of the Sedge Family. Perennial. Very similar to a grass in appearance, but the leaves are arranged in ranks of three at the base, of the flowering stem. Flowers reddish brown, in slender spikelets, which are arranged in a cluster of loose spikes, subtended by an involucre of

three to six leaves. No seeds are produced, and the plant is propagated by small edible tubers which occur at short intervals along the root-stock, and which render the plant so difficult of eradication. Occurs throughout the State in moist ground. August to October. Very abundant eastward.

CONTROL

It is rather difficult to control this pest, as it does not need to make seed in order to spread its growth. The small, brown edible tubers multiply on the roots and from these tubers new plants come each year. Hogs like the tubers and help keep the plant in check in fields that can be pastured by hogs. While there is no very effective remedy for this pest known, about the best is thorough drainage, where the land is in need of drainage, followed by clean and thorough cultivation. Smothering crops will help, and an alternation of hay and hoed crops is likely to be found satisfactory.



NO. 13. YELLOW NUT GRASS OR
CYPERUS ESCULENTUS L.

Cheat. *Bromus secalinus* L.

Also known as Chess or Wheat Thief. Member of the Grass family and closely related to Brome Grass. A winter annual growing about two feet high. Panicle loose, spikelets slightly drooping, each spikelet containing eight or ten flowers. Seed $\frac{1}{3}$ of an inch long, light brown, bearing an awn about half its length. Common throughout the State, and particularly objectionable in wheat and oats. As the plant is hardier than wheat or oats, and the seed is not easily separated from grain in cleaning, it is hard to convince many farmers that their grain does not actually "turn to Cheat." June to July.

CONTROL

Sow clean seed, wheat and oats. As it always comes from the seed, the fields of wheat and oats can be thoroughly cleared of this pest by not allowing any of the "cheat" plants to mature seed, and by not sowing any of the seed with the wheat and oat crops. Of course pulling by hand is quite effective in controlling its spread when it first starts. This is an excellent hay plant and is always welcome in meadows. It becomes a weed only when it gets into the small grain fields, and it may get into these fields through the manure from the animals fed with hay containing it.



NO. 11. CHEAT OR *BROMUS SECALINUS* L.



Sandbur.

Cenchrus tribuloides L.

Called also Sandspur and Bur Grass. An inconspicuous annual grass with short, pale-green sheathing leaves. Spreads over the ground in mats, individual stems sometimes two feet long. Easily recognized by the fruit, which consists of a small, hard bur with sharp, diverging spines. A single branch may bear twenty burs. Painful and dangerous in the harvest field or wherever found. Fruit ripe June to September. Occurs in the eastern part of the State, along the seashore and in sandy ground.

CONTROL

Clean cultivation which prevents the ripening of seed will prevent its spread. Burs stick to passing animals and are thus spread from field to field. Therefore, fields that contain it in large amounts should not be pastured with sheep or, perhaps, cattle that have not shed their winter coat of hair.

NO. 15. SANDBUR OR
CENCHRUS TRIBULOIDES L.

Crab Grass. *Digitaria sanguinalis* (L.) Scop.

Known also as Finger Grass or Crowfoot Grass. A rather coarse annual grass, with stems about three feet high when erect, but usually sprawling on the ground and rooting at the joints. Spikes slender, about five inches long, borne four or five together at the summit of the stem. Seeds small, oval, yellowish-green, wooly. Found throughout the State, July and August.

CONTROL.

Crab Grass is the one implacable enemy of all lawns, alfalfa fields, and cultivated crops in North Carolina, and about the only sure method of control is to prevent seeding by thorough cultivation. It seeds profusely and comes from the seed each year. Mowing lawns to prevent seeding is not entirely successful as some of the stems will lie almost flat on the ground and make seed in spite of close clipping with the lawn mower. Land intended for alfalfa and lawns should be fallowed during the summer preceding the spring planting. The land should be gone over by a weeder or a harrow as often as the small crab grass plants show themselves above ground. Persistence in this practice will kill most, or all, of the crab grass seeds in the soil before the crop is pitched.

Crab grass would always be welcome in hay fields but for the fact that seeds may be scattered through the manure from animals fed with the hay. This grass in the pastures is, however, not only harmless, but makes a most palatable and nutritious feed for cattle.



NO. 16. CRAB GRASS OR *DIGITARIA SANGUINALIS* (L.) SCOP.

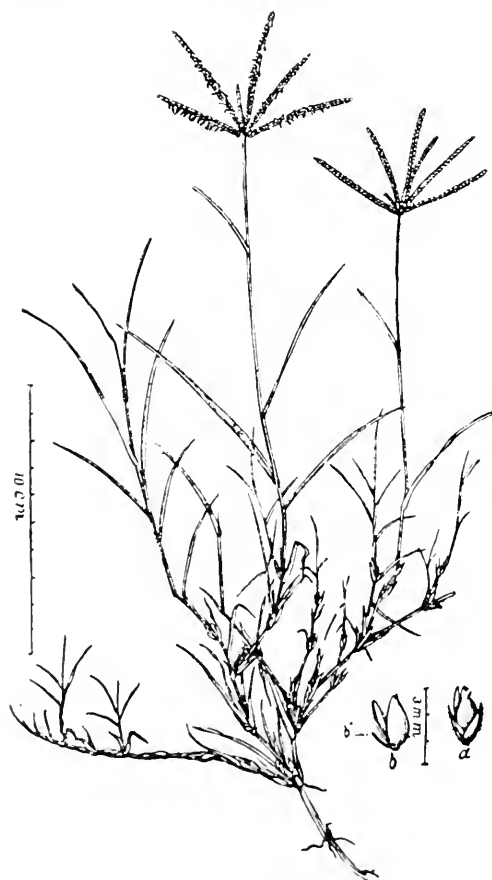
Bermuda Grass. *Cynodon Dactylon* (L.) Pers.

Called also Scutch Grass, Dog's-tooth Grass. Flower stems not over a foot high, produced from long, creeping stolons which are the plant's chief method of propagation. Leaves small, crowded at the base of the flowering stem. Spikes four to five, purplish, arranged in the same manner as the fingers on the hand. Seed small, light yellow, keeled so as to appear half oval in outline. Not abundantly produced in this section, but occurs more or less everywhere throughout the State in lawns, waste places and cultivated fields. Used extensively for lawns and golf courses. July to September.

CONTROL

Not many farmers in North Carolina are afraid of Bermuda Grass as it is coming to be recognized as our very best permanent pasture plant. It is not to be feared as a weed, for good crops can be grown in spite of it, and the land is always left more fertile because of its presence in the soil.

When found in cultivated fields, however, it is a weed in most cases. Shallow plowing and raking out the roots, followed by smothering crops, will generally keep it under control. Bermuda Grass now ripens seed in North Carolina, thus having two methods of extending its spread—by root stocks and by seeds. It must, therefore, be kept from both growing leaves and producing seed in order to kill it entirely—a difficult undertaking.



NO. 17. BERMUDA GRASS OR
CYNODON DACTYLON (L.) PERS.

Handwritten notes and markings at the bottom of the page, including a large 'H' and some illegible scribbles.

THE BULLETIN
OF THE
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE
RALEIGH

Vol. 37, No. 9

SEPTEMBER, 1916

Whole No. 224

REPORT OF SEED TESTS FOR 1916

PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Postoffice at Raleigh, N. C., as second class matter,
February 7, 1901, under Act of June 6, 1900.



LETTER OF TRANSMITTAL

RALEIGH, N. C., August 30, 1916.

HON. W. A. GRAHAM,

Commissioner of Agriculture.

SIR:—In compliance with the North Carolina Seed Act, I have the honor to submit herewith the results of our examination of all the samples of agricultural and vegetable seeds sent to the North Carolina Seed Laboratory from July 1, 1915, to July 1, 1916.

These examinations and tests were made by Mr. C. H. Waldron, our seed analyst, assisted by Miss Alma I. Stone, our assistant seed analyst.

I beg to recommend the publication of these results as the September BULLETIN of the Division of Botany and Agronomy of this department.

Respectfully submitted,

JAMES L. BURGESS,

State Agronomist.

Approved:

W. A. GRAHAM,

Commissioner of Agriculture.

REPORT OF THE DIVISION OF BOTANY AND AGRONOMY FOR 1916

The present publication is the sixth annual report of seed tests made by this department, and includes all samples received from July 1, 1915, to July 1, 1916. During this time 1,345 samples in all have been tested: total agricultural seed samples 973, samples from inspectors 575, samples from individuals 398. Germination tests were made of 372 samples of vegetable seeds. Also 78,386 c.e. of tobacco seed were received and cleaned for farmers of the State as against 59,362 c.e. received in 1915.

The farmers are taking an increasing interest in the use of better seeds. The degree of their interest may be seen from the number of seed samples they send from year to year to the Seed Laboratory for examination. During 1914 individual farmers sent on their own initiative 228 samples of seeds for examination; during 1915 284 samples, and during the year ending July 1, 1916, 405 samples.

A shortage in funds compelled the commissioner to call the seed inspectors out of the field about a month before their work was completed. This action reduced the total number of inspector's samples collected and greatly interfered with the regulatory work of the Seed Laboratory the past year.

RELATIVE STANDING OF NORTH CAROLINA SEED LABORATORY

Nothing shows more conclusively the efficiency of a seed laboratory than the germination test. At the beginning of this year the Association of American Seed Analysts, of which organization the North Carolina Seed Laboratory is a member, submitted through its secretary, Mr. Oswald, twenty-one different samples of the most difficultly germinating seeds to the fifty-one different seed laboratories throughout the United States and Canada for the purpose of testing the efficiency of these different laboratories.

This test of efficiency meant a great deal to the different laboratories and to the people served by them.

The following table shows the result of this crucial test, and North Carolinians will be delighted to note that their laboratory stands among the first on the continent in point of efficiency of service.

Number 12 in the table is the number assigned to North Carolina, and one has only to compare this number with the other numbers to ascertain the standing of our laboratory as compared with the other seed laboratories of North America.

The figures in the column marked "laboratory number" designate the different seed laboratories in North America. The numbers in the columns under the names of the different seeds, as "red clover," etc., represent the percentage of germination secured by the different laboratories in the United States and Canada, testing portions of the same sample.

TABLE O. RESULTS OF GERMINATION TESTS.

Laboratory Number	Red Clover	White Clover	Alfalfa Clover	Alfalfa	Soy Beans	Timothy	Mill. E.	Red Top	Brown Grass	Orchard Grass (1)	Orchard Grass (2)	Per. Rye Grass	Blue Grass (1)	Blue Grass (2)	Blue Grass (3)	Blue Grass (4)	Lettuce	Beets	Spinach	Union	Laboratory Number
2	84	74	79	68	100	96	91	96	77	82	65	81	62	76	33	42	96	63	67	89	2
3	84	84.5	84.5	62.5	91	95.5	95.5	89	90.5	64.5	56.5	78.5	35.5	71	45	83.5	96	45.5	27.5	83.5	3
5	82.5	80	81	72	89	99.5	95	86	89.5	75.5	67	86.5	75.5	-----	68.5	-----	77.5	74	56.5	86.5	5
6	82	78.5	78.5	71.5	94.5	95.8	88	88.8	96.5	-----	-----	86	-----	-----	-----	-----	67	62	69.5	88.5	6
7	79.5	76.5	80	68	88	94	90.5	92	95	75.5	67.5	86	28.5	44.5	26.5	48	84.5	64	58.5	81	7
9	82.5	74	77.5	69.5	90	99	94	96	69.5	75.5	93	93	59	-----	83.5	-----	82.5	66.5	58	84.5	9
10	77.5	84	76.5	68	87.5	98.5	90	63	87	70.5	56.5	87	65	62.5	46	49	40.7	79.5	40	86	10
12	88.5	78.8	80.5	68	87	99	95.8	90.3	93.5	78	82	83	85	-----	84.5	-----	91.5	83	71.5	87	12
13	78.5	75	78.5	68.5	92	97	93.5	93	94.5	86.5	77	88.5	89	88.5	73	85	88.5	74.5	69	83	13
15	91	82.5	79.5	72	93	97	86.5	94	93.5	77.5	79.5	86	77	-----	75.5	-----	89	73	54	89	15
18	86	63	65	68	82	96	91	80	81	70	48	83	45	-----	36	-----	88	24	22	74	18
21	77	79.5	81.5	64	86	94.5	92	89	95.5	80	69	84	75	-----	71	-----	91	53	41.5	86.5	21
22	87	85.5	85.5	76	94.5	96.5	94.5	87.5	94	74	69.5	92	59	64	40.5	50.5	59	79.5	66.5	88	22
24	95	93	95	85	97	95	92	96	92	79	30	94	65	77	80	40	88	80	69	91	24
25	85	40	60	80	93	99	87	63	96	53	44	87	38	-----	24	-----	-----	89	78	55	25
26	90	86	82.5	76.5	91	99	92.5	93	97.8	92	83	90.5	75.5	-----	90	-----	94.5	70.5	75	88.5	26
27	79.5	82.5	79.5	69.5	91	98.5	95	90.5	91.5	71	72	84	71	-----	78	-----	88.5	65.5	65.5	85	27
28	81	81	83.5	72	92.5	98	86	96	89.5	83	73.5	86	87	-----	85	-----	91.5	72	62	93	28
29	81.5	84.5	82.5	71.5	92	96	95.3	92.5	94.5	81	65	85	78.5	-----	74	-----	90	76.5	65.5	82.5	29
30	92	94	90	58	98	100	95	90	92	80	75	96	60	-----	52	-----	94	80	7	5	30

31	80.5	75.5	81.5	68.5	90	96.5	89	86	92.5	90.5	72.5	58.5	84	71	47	67	65	53.5	87.5	31
32	86.1	86.7	87.5	66.7	91.2	97.1	98.5	87.9	96	100	85	68.5	88.8	40.8	30.4	24.9	46.5	63.3	27	89.9
34	80	82.5	79.5	61.5	83	98.5	94	91	90	92.6	71	65.5	85.5	15	58.5	17.5	59	87	70	55
35	92	85.5	85	65.5	94	97	93	93.5	89.5	95.5	85	53	86	82	78	92	30	12.5	84	35
36	83	80	69	60	87	98.5	92	91	76	95	52	44	91	87	78	98	76	48	90	36
37	79	69	82	68	84	85	84	87	87	92	79	47	87	87	78	78	75	45	86	37
38	43.8	36.4	36.8	49.3	50.6	91.5	33.5	.....	29.5	49.3	34.5	9.8	25.8	.....	.....	.....	.....	69.5	87.5	38
39*	.....	90	76	68	.....	97	90	90	92	89	27	37	87	33	29	91	82	64	86	39
45*	84.5	80.5	84	63.5	87.5	96.5	91.5	87.5	97	93.5	82	81.5	86.5	77.5	89	74.5	90	58	70	84
47*	88.5	78.5	84	67.5	93	98.5	98	92	91.5	93.5	82.5	76	86.5	71	80	92	56	67	80.5	47
48*	81	82	81.5	79.5	91	98	96	92	110.5	94	78	80	90.5	70.5	68	68	91.5	65	90.5	48
49*	81	68	81	70.5	93.5	.....	88.5	89.5	90	94	63.5	54.5	86	13	14	86	62	48	85.5	49
50*	86	83.5	86.5	66.5	90.5	97	95.5	88.5	93	94.5	.....	.....	88.5	.....	.....	.....	.....	.....	.....	50
51	80	75.5	81.5	62	86	90.5	91	95.5	89.5	95	50	40.5	84.5	55.5	40.5	79	64	47	92	51

*Commercial laboratories.

TABLE No. 1.

TOTAL NUMBER OF SAMPLES OF AGRICULTURAL SEEDS RECEIVED.

Name	Inspectors' Samples	Samples from Individuals
Alfalfa.....	14	24
Barley.....	1	0
Beans, Soja.....	2	7
Beans, Velvet.....	0	2
Blue Grass, Canada.....	0	1
Blue Grass, Kentucky.....	30	5
Cane.....	1	0
Clover, Alsike.....	6	7
Clover, Burr.....	0	4
Clover, Crimson.....	58	74
Clover, Japan.....	2	4
Clover, Red.....	95	41
Clover, Sweet.....	3	3
Clover, White.....	2	2
Corn, Field.....	19	49
Cotton.....	0	4
Cowpeas.....	0	3
Fescue, Meadow.....	2	1
Grass, Brome.....	0	1
Grass, Italian Rye.....	1	0
Grass, Johnson.....	0	1
Grass, Orchard.....	39	23
Grass, Perennial Rye.....	0	1
Grass, Sudan.....	4	10
Grass, Tall Meadow Oat.....	7	3
Millet, German.....	1	2
Millet, Pearl.....	7	0
Oats.....	128	60
Rape.....	45	4
Redtop.....	37	24
Rye.....	19	19
Timothy.....	42	12
Vetch, Spring.....	2	0
Vetch, Winter.....	9	3
Wheat.....	0	5
Totals.....	576	399
Total of all agricultural seeds.....	975	

TABLE No. 2.
TOTAL NUMBER OF SAMPLES OF VEGETABLE SEEDS RECEIVED.

Wholesale Dealer	1914	1915	1916
American Seed Co., Detroit, Mich.	0	8	26
W. W. Barnard Co., Chicago, Ill.	9	3	3
J. Bolgiano & Sons, Baltimore, Md.	2	2	0
Robert Buist Co., Philadelphia, Pa.	63	47	10
Everett B. Clark Seed Co., Milford, Conn.	0	2	3
Crosman Bros. Co., Rochester, N. Y.	113	10	27
Diggs & Beaulles, Richmond, Va.	5	2	7
D. M. Ferry & Co., Detroit, Mich.	233	92	23
Girardeau Seed Co., Monticello, Fla.	0	1	0
Griffith & Turner Co., Baltimore, Md.	0	0	3
Lake Shore Seed Co., Dunkirk, N. Y.	95	25	23
D. Landreth Seed Co., Bristol, Pa.	54	47	30
Leonard Seed Co., Chicago, Ill.	27	27	31
Louisville Seed Co., Louisville, Ky.	0	0	1
L. L. May & Co., St. Paul, Minn.	18	0	0
George R. Pedrick & Son, Pedricktown, N. Y.	0	1	0
J. B. Rice Seed Co., Cambridge, N. Y.	73	38	36
Rockford Seed Co., Rockford, Ill.	0	1	0
Slate Seed Co., South Boston, Va.	0	10	13
T. W. Wood & Sons, Richmond, Va.	81	94	16
Wood, Stubbs & Co., Louisville, Ky.	0	30	30
Dealer not given	0	5	23
Totals	818	115	365

SEED SHOULD BE TESTED AND THE VALUE KNOWN BEFORE PURCHASING.

The wisdom of having seed tested and of knowing the actual cost and value of the seed to be planted may be illustrated by the following data. These samples were tested in the laboratory, and are fairly typical of the different grades of seed offered on the market at the same price.

TABLE No. 3.

Laboratory Number	Kind of Seed	Retail Price	Actual Cost	Actual Value
1388.....	Crimson Clover.....	\$0.15 per pound...	\$0.16 per pound...	95 per cent.
2232.....	Crimson Clover.....	.15 per pound...	1.30 per pound...	11 per cent.
1427.....	Red Clover..... (No Dodder.)	.20 per pound...	.21 per pound...	96 per cent.
1409.....	Red Clover..... (Dodder Present.)	.20 per pound...	.30 per pound...	48 per cent.
2108.....	Orchard Grass.....	.20 per pound...	.22 per pound...	73 per cent.
2024.....	Orchard Grass.....	.20 per pound...	.56 per pound...	25 per cent.
1534.....	Redtop.....	.20 per pound...	.22 per pound...	87 per cent.
2157.....	Redtop.....	.20 per pound...	.32 per pound...	37 per cent.

HOW TO SEND SEED SAMPLES FOR TESTING.

Of the smaller seed, such as the grasses and clovers, about three or four tablespoonfuls is a sufficient amount to send for testing. Of the larger seeds, as corn and oats, about a cupful is necessary. The following information should accompany all samples: Name and address of wholesale and retail dealer, retail price, and name and address of sender. Samples should be securely wrapped and addressed to

THE NORTH CAROLINA SEED LABORATORY,

DEPARTMENT OF AGRICULTURE,

RALEIGH, N. C.

TABLE No. 4.

SHOWING THE FIFTY WEED SEEDS OF MOST COMMON OCCURRENCE,
FOUND IN ALL OF THE SAMPLES TESTED FOR PURITY.

(849 Samples Examined.)

Scientific Name	Common Name	Found in
1 <i>Rumex acetosella</i>	Field Sorrel.....	298 samples
2 <i>Rumex crispus</i>	Curled Dock.....	197 samples
3 <i>Plantago lanceolata</i>	Buckhorn.....	182 samples
4 <i>Medicago lupulina</i>	Black Medick.....	177 samples
5 <i>Plantago Rugelii</i>	Rugel's Plantain.....	118 samples
6 <i>Lychnis alba</i>	White Campion.....	110 samples
7 <i>Alopecurus agrestis</i>	Slender Foxtail.....	109 samples
8 <i>Chrtachloa viridis</i>	Green Foxtail.....	81 samples
9 <i>Potentilla monspeliensis</i>	Rough Cinquefoil.....	80 samples
10 <i>Achillea millefolium</i>	Yarrow.....	63 samples
11 <i>Cerastium vulgatum</i>	Mouse-ear Chickweed.....	61 samples
12 <i>Juncus sp.</i>	Rush.....	60 samples
13 <i>Geranium dissectum</i>	Cut-leaved Cranesbill.....	57 samples
14 <i>Daucus carota</i>	Wild Carrot.....	56 samples
15 <i>Lepidium apetalum</i>	Peppergrass.....	55 samples
16 <i>Bromus secalinus</i>	Chess.....	55 samples
17 <i>Chenopodium album</i>	Lamb's Quarters.....	50 samples
18 <i>Melilotus alba</i>	White Sweet Clover.....	49 samples
19 <i>Sisyrinchia arvensis</i>	Blue Field-madder.....	47 samples
20 <i>Bromus hordeaceus</i>	Soft Chess.....	45 samples
21 <i>Chrtachloa glauca</i>	Yellow Foxtail.....	40 samples
22 <i>Ambrosia artemisiifolia</i>	Western Ragweed.....	39 samples
23 <i>Vicia hirsuta</i>	Hairy Vetch.....	37 samples
24 <i>Anthyllis vulneraria</i>	Kidney Vetch.....	37 samples
25 <i>Koeleria sp.</i>	Mountain Mint.....	35 samples
26 <i>Bursa-pastoris</i>	Shepherd's Purse.....	34 samples
27 <i>Polygonum persicaria</i>	Lady's-thumb.....	31 samples
28 <i>Carex cephalophora</i>	Oval-headed Sedge.....	29 samples
29 <i>Prunella vulgaris</i>	Headsall.....	29 samples
30 <i>Agrostemma githago</i>	Corn Cockle.....	27 samples
31 <i>Panicularia americana</i>	Manna Grass.....	25 samples
32 <i>Holcus lanatus</i>	Velvet Grass.....	23 samples
33 <i>Rudbeckia hirta</i>	Black-eyed Susan.....	22 samples
34 <i>Lolium temulentum</i>	Darnel.....	20 samples
35 <i>Veronica arvensis</i>	Corn Speedwell.....	20 samples
36 <i>Syntherisma sanguinale</i>	Crab-grass.....	18 samples

TABLE No. 4—CONTINUED.

Scientific Name	Common Name	Found in
37 <i>Chrysanthemum leucanthemum</i>	Ox-eye Daisy.....	17 samples
38 <i>Conringia orientalis</i>	Hare's-ear Mustard.....	17 samples
39 <i>Geranium pusillum</i>	Small-flowered Cranesbill.....	17 samples
40 <i>Geranium molle</i>	Dove's-foot Cranesbill.....	17 samples
41 <i>Polygonum pennsylvanicum</i>	Smartweed.....	15 samples
42 <i>Polygonum convolvulus</i>	Black Bindweed.....	15 samples
43 <i>Onagra biennis</i>	Evening Primrose.....	15 samples
44 <i>Plantago aristata</i>	Aristate Plantain.....	14 samples
45 <i>Lithospermum arvense</i>	Corn Gromwell.....	14 samples
46 <i>Echinochloa crus-galli</i>	Barnyard Grass.....	14 samples
47 <i>Holcus mollis</i>	Meadow Soft Grass.....	12 samples
48 <i>Plantago major</i>	Plantain.....	11 samples
49 <i>Anthemis cotula</i>	Mayweed.....	11 samples
50 <i>Allium vineale</i>	Wild Garlic.....	11 samples

TABLE No. 5.

TOBACCO SEED RECLEANED FOR THE FARMERS OF THE STATE.

Laboratory Number	Name and Address of Sender	Amount of Re-cleaned Seed Returned
5484	Quint Adams, R. F. D. 1, Garner, N. C.	115 e. c.
5475	John Albertson, Kenansville, N. C.	118 e. c.
5437	J. R. & J. A. Aldridge, Haw River, N. C.	62 e. c.
5499	J. H. Arnold, R. F. D. 3, Neuse, N. C.	15 e. c.
5448	R. A. Bailey, Robersonville, N. C.	190 e. c.
5446	R. F. Beasley, R. F. D. 1, Smith, N. C.	140 e. c.
5423	S. A. Beasley, R. F. D. 1, Peter's Creek, Va.	168 e. c.
5494	G. M. Beavers, R. F. D. 1, Apex, N. C.	25 e. c.
5395	T. B. Bennett, R. F. D. 3, Stantonburg, N. C.	415 e. c.
5432	G. H. Bergeson, Washington, N. C.	105 e. c.
5417	E. L. Boswell, Union Ridge, N. C.	480 e. c.
5479	H. T. Brown, Sandy Ridge, N. C.	39 e. c.
5452	E. P. Burge, R. F. D. 3, Pilot Mountain, N. C.	80 e. c.
5467	G. T. Burge, R. F. D. 3, Pinnacle, N. C.	140 e. c.
5455	W. B. Byrum, R. F. D. 1, Harrellsville, N. C.	85 e. c.
5398	Elias Carr, Raleigh, N. C.	250 e. c.
5426	D. C. Chamblee, Zebulon, N. C.	124 e. c.
5474	J. E. Clack, Dabney, N. C.	115 e. c.
5430	R. B. Courts, Reidsville, N. C.	105 e. c.
5480	Dan Valley Farm, Blanch, N. C.	100 e. c.
5459	J. M. Davis, Boonville, N. C.	54 e. c.
5481	J. R. Dozier, Fountain, N. C.	95 e. c.
5424	H. G. Ellington, R. F. D. 5, Henderson, N. C.	277 e. c.
5439	E. L. Evans, Harrellsville, N. C.	125 e. c.
5397	J. E. Ferguson, R. F. D. 7, Raleigh, N. C.	270 e. c.
5473	B. L. Fling, Middleburg, N. C.	112 e. c.
5476	R. E. L. Flippin, Pilot Mountain, N. C.	128 e. c.
5431	H. G. Forney, Bricks, N. C.	105 e. c.
5429	H. G. Forney, Bricks, N. C.	90 e. c.
5472	F. C. Glasgow, R. F. D. 4, Louisburg, N. C.	445 e. c.
5450	E. A. Glover, Dabney, N. C.	350 e. c.
5444	P. B. Goodson, Mount Olive, N. C.	38 e. c.
5470	S. W. Greenway, Dabney, N. C.	340 e. c.
5462	J. O. Green, Franklinton, N. C.	385 e. c.
5440	R. N. Harper, R. F. D. 4, Nashville, N. C.	95 e. c.
5428	E. C. Harris, R. F. D. 3, Oxford, N. C.	120 e. c.

TABLE No. 5—CONTINUED.

Laboratory Number	Name and Address of Sender	Amount of Recleaned Seed Returned
5402	H. B. Harris, R. F. D. 6, Oxford, N. C.....	134 c. e.
5416	W. T. Hawkins, Hurdle Mills, N. C.....	125 c. e.
5415	J. R. Herndon, R. F. D. 3, Durham, N. C.....	145 c. e.
5419	G. B. Hicks, R. F. D. 1, Knightdale, N. C.....	260 c. e.
5497	H. T. Highfill, Mayodan, N. C.....	55 c. e.
5454	Willie Hinton, R. F. D. 4, Apex, N. C.....	85 c. e.
5465	Monroe Hunter, R. F. D. 1, Mount Airy, N. C.....	13 c. e.
5460	S. W. Ipock, Grifton, N. C.....	1,100 c. e.
5420	J. L. Jackson, R. F. D. 4, Mount Airy, N. C.....	60 c. e.
5445	Clayton Jeffries, R. F. D. 3, Mebane, N. C.....	83 c. e.
5442	James Jeffries, Watson, N. C.....	250 c. e.
5483	J. W. Jeffries, R. F. D. 3, Mebane, N. C.....	70 c. e.
5496	J. W. Jeffries, R. F. D. 3, Mebane, N. C.....	190 c. e.
5486	W. A. Jeffries, R. F. D. 3, Mebane, N. C.....	70 c. e.
5422	H. A. Jenkins, Robersonville, N. C.....	135 c. e.
5485	F. D. Jones, R. F. D. 1, Kernersville, N. C.....	45 c. e.
5468	G. H. Jones, Willow Springs, N. C.....	403 c. e.
5464	J. T. Joyce, R. F. D. 2, Sandy Ridge, N. C.....	80 c. e.
5447	J. W. Joyce, Sandy Ridge, N. C.....	95 c. e.
5457	W. A. Kealon, R. F. D. 4, Mount Airy, N. C.....	65 c. e.
5466	C. L. Lasater, R. F. D. 4, Apex, N. C.....	95 c. e.
5461	J. R. Lasater, R. F. D. 4, Apex, N. C.....	300 c. e.
5421	A. B. Lassiter, R. F. D. 1, Smithfield, N. C.....	75 c. e.
5487	Peter Liggins, R. F. D. 3, Mebane, N. C.....	155 c. e.
5405	Thomas S. Mallory, R. F. D. 2, Reidsville, N. C.....	273 c. e.
5413	T. M. Martin, Sandy Ridge, N. C.....	175 c. e.
5493	J. H. Massey, R. F. D. 2, Zebulon, N. C.....	140 c. e.
5488	George H. Maurice, Eagle Springs, N. C.....	340 c. e.
5458	W. H. Maynard, R. F. D. 6, Durham, N. C.....	100 c. e.
5498	M. V. Mooneyhan, R. F. D. 5, Raleigh, N. C.....	113 c. e.
5490	I. M. Moore, Stokes, N. C.....	680 c. e.
5443	L. O. Moseley, Kinston, N. C.....	72 c. e.
5491	E. W. Neel, R. F. D. 2, Princeton, N. C.....	50 c. e.
5463	L. E. Nichols, Siloam, N. C.....	68 c. e.
5404	J. G. Oakley, R. F. D. 7, Raleigh, N. C.....	265 c. e.
5408	Alfred Plummer, Middleburg, N. C.....	170 c. e.
5495	L. L. Powell, Blanch, N. C.....	160 c. e.
5434	R. T. Rimmer, Hurdle Mills, N. C.....	200 c. e.
5400	J. D. Ross, R. F. D. 6, Durham, N. C.....	117 c. e.

TABLE No 5- CONTINUED.

Laboratory Number	Name and Address of Sender	Amount of Recleaned Seed Returned
5451	W. T. Rowland, Middleburg, N. C.....	115 c. e.
5435	W. H. Rudder, Hurdle Mills, N. C.....	30 c. e.
5403	R. H. Russell, R. F. D. 5, Roxboro, N. C.....	68 c. e.
5406	John Scott, R. F. D. 2, Reidsville, N. C.....	232 c. e.
5469	C. F. Shields, R. F. D. 1, Kernersville, N. C.....	55 c. e.
5411	E. E. Slaughter, R. F. D. 3, Pilot Mountain, N. C.....	35 c. e.
5409	George Sloan, Apex, N. C.....	70 c. e.
5427	I. F. Smith, Walstonburg, N. C.....	157 c. e.
5407	A. F. Snody, Mount Airy, N. C.....	320 c. e.
5478	W. O. Tanner, R. F. D. 1, Norlina, N. C.....	195 c. e.
5399	H. E. Taylor, R. F. D. 2, Mount Airy, N. C.....	95 c. e.
5418	O. K. Taylor, Whitakers, N. C.....	100 c. e.
5396	Pervis Tilley, Bahama, N. C.....	14,290 c. e.
5401	Pervis Tilley, Bahama, N. C.....	47,635 c. e.
5477	J. W. Turner, R. F. D. 3, Burlington, N. C.....	200 c. e.
5456	W. J. Turner, R. F. D. 3, Burlington, N. C.....	150 c. e.
5482	O. B. Umstead, R. F. D. 1, Stagville, N. C.....	100 c. e.
5449	W. C. Vick, R. F. D. 2, Spring Hope, N. C.....	83 c. e.
5436	S. J. Vincent, R. F. D. 2, Greenville, N. C.....	215 c. e.
5492	J. F. Walters, Blanch, N. C.....	80 c. e.
5441	J. I. Warner, King, N. C.....	60 c. e.
5412	W. C. Warren, R. F. D. 3, Burlington, N. C.....	90 c. e.
5489	T. F. Wiggins, Middleburg, N. C.....	105 c. e.
5433	R. L. Wilburn, Hurdle Mills, N. C.....	135 c. e.
5471	G. N. Wilder, R. F. D. 2, Spring Hope, N. C.....	25 c. e.
5425	G. N. Wilder, R. F. D. 2, Spring Hope, N. C.....	15 c. e.
5410	D. W. L. Wilkins, Kinston, N. C.....	115 c. e.
5453	W. J. Wilson, Apex, N. C.....	120 c. e.
5438	C. L. Wrenn, R. F. D. 2, Garner, N. C.....	480 c. e.
5414	M. T. Yates, Apex, N. C.....	105 c. e.
	Total.....	78,386 c. e.

TABLE No. 6.

AGRICULTURAL SEEDS FROM THE FOLLOWING 45 WHOLESALE DEALERS
WERE COLLECTED FROM THE NORTH CAROLINA MARKET AND TESTED.

<i>Dealer.</i>	<i>Location.</i>
Adams Grain and Provision Co.	Charlotte, N. C.
Adams Grain and Provision Co.	Norfolk, Va.
Adams Grain and Provision Co.	Richmond, Va.
Beveridge, S. T., & Co.	Richmond, Va.
Blamberg Bros.	Baltimore, Md.
Bolgiano, J., & Son	Baltimore, Md.
Buffington, J. J., & Co.	Baltimore, Md.
Buist, Robert Co.	Philadelphia, Pa.
Carter, Venable & Co.	Richmond, Va.
Beans, P. B.	Wilson, N. C.
Diggs & Beadles	Richmond, Va.
Dixon, D. H.	Goldsboro, N. C.
Durham Seed House	Durham, N. C.
Gillette Grain Co.	Nashville, Tenn.
Gore, D. L.	Wilmington, N. C.
Griffith-Turner Co.	Baltimore, Md.
Hackney, Broyles & Lackey	Knoxville, Tenn.
Hall & Pearsall	Wilmington, N. C.
Hamilton, Bacon, Hamilton Co.	Bristol, Tenn.
Hardin, Hamilton & Lewman	Louisville, Ky.
Hickory Seed Co.	Hickory, N. C.
Hines, E. G.	Goldsboro, N. C.
Kirby Seed Co.	Gaffney, S. C.
Landreth, D., Seed Co.	Bristol, Pa.
Louisville Seed Co.	Louisville, Ky.
McNair & Pearsall	Wilmington, N. C.
Mayo Milling Co.	Richmond, Va.
National Seed Co.	Louisville, Ky.
Pearsall & Co.	Wilmington, N. C.
Philadelphia Seed Co.	Philadelphia, Pa.
Radwaner, I. L.	New York, N. Y.
Rice, Jerome B., Seed Co.	Cambridge, N. Y.
Richardson, W. F., Jr., & Co.	Richmond, Va.
Roanoke Seed & Supply Co.	Roanoke, Va.
Roper & Co.	Petersburg, Va.
Savage, N. R., & Son.	Richmond, Va.
Scarlett, Wm. G., & Co.	Baltimore, Md.
Slate Seed Co.	South Boston, Va.
Slayden, Fakes & Co.	Asheville, N. C.
Smith Seed & Feed Co.	Danville, Va.
Stricker, L. R.	Asheville, N. C.
Tait, Geo., & Son.	Richmond, Va.
Tate, W. R.	Nashville, Tenn.
Wood, T. W., & Sons	Richmond, Va.
Wood, Stubbs & Co.	Louisville, Ky.

TABLE No. 7.

ADDRESSES AND NAMES OF 191 RETAIL DEALERS IN 93 TOWNS, FROM WHOM AGRICULTURAL SEED SAMPLES WERE COLLECTED AND TESTED.

<i>Location.</i>	<i>Dealer.</i>
Ahoskie	S. E. Dilday.
Andrews	W. B. Fisher.
Asheboro	Randolph Supply Co.
Asheboro	J. T. Turner.
Asheville	Grant's Pharmacy.
Asheville	T. S. Morrison & Co.
Asheville	L. R. Stricker.
Ayden	J. R. Smith & Co.
Belhaven	J. F. Bishop.
Benson	C. T. Johnson.
Benson	Parrish, Goodwin Co.
Benson	Peacock Drug Co.
Benson	J. H. Wheeler.
Boone	M. B. Blackburn.
Brevard	W. S. Ashworth & Sons.
Brevard	Brevard Hardware Co.
Bryson City	D. K. Collins.
Bryson City	J. H. Ditmore.
Burgaw	Pender Cash Grocery Co.
Canton	G. L. Hampton.
Canton	W. T. Sharp.
Charlotte	Davidson & Wolfe.
Charlotte	Johnston Bros.
Clayton	J. J. Barbour & Sons.
Clayton	Ashley Horne & Sons.
Clinton	Butler & Honeycutt.
Clinton	W. D. Kelly.
Clinton	D. M. Patrick & Co.
Clinton	J. C. Peterson.
Clinton	B. F. Powell.
Clinton	Register Bros.
Dillsboro	Holmes Bryson.
Dunn	W. D. Holland.
Dunn	Hood & Grantham.
Durham	Durham Seed House.
Elizabeth City	F. P. Nash.
Elizabeth City	Spence & Hollowell.
Elizabeth City	W. S. White & Co.
Elkin	S. W. Y. Supply Co.
Elm City	J. L. Bailey.
Elm City	Braswell, Dawes & Co.
Elm City	R. S. Wells.
Fair Bluff	Rogers & Waddell.
Fairmont	A. J. Floyd.
Fairmont	P. R. Floyd.
Fairmont	W. A. Griffin.
Faison	J. F. Faison.
Faison	Faison Drug Co.
Fayetteville	A. S. Huske.
Fremont	Z. M. L. Peacock.
Gastonia	Gaston Seed & Provision Co.
Gastonia	Lineberger Seed Co.
Goldsboro	M. J. Best & Sons.
Goldsboro	Jeffreys & Sons.

<i>Location.</i>	<i>Dealer.</i>
Goldsboro	B. G. Thompson & Sons.
Goldsboro	T. N. Waters & Bro.
Granite Falls	L. T. Sharp.
Greensboro	Carolina Warehouse Co.
Greensboro	J. F. Fulton.
Greensboro	Scott Seed Co.
Greenville	W. H. Allen.
Greenville	J. B. Johnston.
Greenville	S. M. Schultz.
Greenville	Winslow & Allen.
Halifax	N. L. Stedman & Co.
Hazelwood	W. H. McClure.
Henderson	Harris & Evans.
Henderson	Landis Grocery Co.
Henderson	W. W. Parker.
Hendersonville	Bly Hardware Co.
Hendersonville	Byers Bros.
Hendersonville	J. O. Houston & Son.
Hendersonville	Hunter's Pharmacy.
Hickory	Boyd Feed Co.
Hickory	City Feed Co.
Hickory	Hickory Seed Co.
High Point	High Point Hardware Co.
Jacksonville	S. W. Aman & Sons.
Jacksonville	W. H. Horne & Co.
Jefferson	E. A. McNeill.
Kernersville	W. S. Linville & Son.
Kinston	Churchill & Co.
Kinston	C. A. Dawson & Bro.
Kinston	J. E. Hood & Co.
Kinston	Lenoir Drug Co.
Kinston	E. B. Marston Drug Co.
Kinston	Temple Drug Co.
La Grange	J. P. Walters.
Laurel Springs	W. R. McNeill.
Laurel Springs	F. Miller.
Lenoir	Harrison & Co.
Lexington	Lexington Hardware Co.
Lexington	S. L. Owen.
Lexington	Penry Grocery Co.
Lillington	Atkins Bros.
Lincolnton	Lincoln Farmers' Union Warehouse Co.
Littleton	Eugene Johnson.
Littleton	S. J. Stallings.
Macon	W. G. Egerton.
Macon	E. B. Stallings.
Marion	J. D. Blanton.
Marshall	W. J. Gudger & Sons.
Marshall	R. N. Ramsey.
Maxton	J. W. Carter & Co.
Mocksville	Dwiggins & Green.
Mocksville	C. C. Sanford's Sons Co.
Mocksville	Walker's Bargain House.
Monroe	F. B. Ashcraft.
Mooreville	Harris & McNeely.
Mooreville	W. M. Neel & Co.
Morganton	Farmers' Union Warehouse Co.
Morganton	L. A. Kincaid.
Morganton	Leslie's Drug Store.
Mount Airy	W. E. Merritt & Co.
Mount Airy	Mount Airy Feed Store.
Mount Airy	Arnold Quesinberry.

<i>Location.</i>	<i>Dealer.</i>
Mount Holly	F. H. Dunn.
Mount Olive	Y. H. Knowles & Co.
Mount Olive	W. P. Kornegay.
Mount Olive	M. W. Pope.
Mount Olive	Rose & Herring.
Murphy	John E. Fain.
Murphy	R. H. Hyatt & Co.
Nashville	Cockerell & Williams.
Nashville	King Co-operative Co.
Nashville	Nash Supply Co.
Nashville	B. H. B. Vester.
Nashville	J. D. Winstead.
New Bern	C. B. Hill.
New Bern	J. A. Meadows.
New Bern	C. L. Spencer.
Newton	Catawba Co. Farmers' Union Whse. Co.
Newton	George Moose.
North Wilkesboro	C. Call.
North Wilkesboro	Miller Grocery Co.
Oxford	L. Thomas.
Raleigh	S. J. Adams.
Raleigh	W. A. Myatt.
Raleigh	F. W. Parker Drug Co.
Red Springs	Garrett & McNeill.
Red Springs	Red Springs Drug Co.
Reidsville	Hazell & Mims.
Reidsville	C. H. Pettigrew.
Reidsville	W. P. Ware.
Rocky Mount	Dozier, Thorne & Co.
Rocky Mount	H. C. Joyner.
Rural Hall	E. L. Kiser & Co.
Salisbury	W. L. Kluttz.
Salisbury	M. C. Ruffy.
Sanford	Wilkins, Ricks & Co.
Scotland Neck	Burroughs, Pittman & Wheeler.
Scotland Neck	Edwards & Co.
Scotland Neck	J. R. Josey.
Shelby	H. E. Kendall.
Shelby	McMurry, Hall & Co.
Shelby	J. E. Webb.
Siler City	H. C. Reece.
Southport	P. O. Leggett.
Statesville	Sherrill & Reese.
Statesville	J. E. Sloop.
Sylva	Sylva Supply Co.
Tabor	H. C. Jarrell.
Tarboro	W. S. Clark & Sons.
Tarboro	R. B. Peters Grocery Co.
Tarboro	Robinson-Ruffin Co.
Taylorsville	J. B. Barnes.
Todd	W. S. Miller & Co.
Vineland	Powell & Co.
Vineland	Vineland Dry Goods Co.
Wadesboro	Fox & Lyon.
Wadesboro	J. D. Howe.
Warsaw	Hobbs & Russ.
Warsaw	J. C. Russ.
Warsaw	Wilson & Hill.
Washington	E. P. Carter & Co.
Washington	Jonathan Havens.
Waynesville	Hyatt & Co.
West Jefferson	Ashe Supply & Hardware Co.

<i>Location.</i>	<i>Dealer.</i>
West Jefferson	West Jefferson Supply Co.
Williamston	Harrison Bros. & Co.
Wilmington	D. L. Gore.
Wilmington	W. J. Kirkham & Co.
Wilson	Hadley-Harris Co.
Wilson	Doane Herring.
Wilson	Ruffin-High Co.
Wilson	P. L. Woodard Co.
Windsor	J. B. Gilliam.
Winston-Salem	Farmers' Cash Seed & Feed Co.
Winston-Salem	Farmers' Union Agency Co.
Winston-Salem	Piedmont Feed Store.
Winston-Salem	Riggins Feed & Seed Co.

TABLE No. 8.

AGRICULTURAL SEED SAMPLES WERE COLLECTED IN THE FOLLOWING
SIXTY-THREE COUNTIES.

Alexander.	Edgecombe.	New Hanover.
Alleghany.	Forsyth.	Onslow.
Anson.	Gaston.	Pasquotank.
Ashe.	Granville.	Pender.
Beaufort.	Guilford.	Pitt.
Bertie.	Halifax.	Randolph.
Brunswick.	Harnett.	Robeson.
Buncombe.	Haywood.	Rockingham.
Burke.	Henderson.	Rowan.
Caldwell.	Hertford.	Sampson.
Catawba.	Iredell.	Surry.
Chatham.	Jackson.	Swain.
Cherokee.	Johnston.	Transylvania.
Cleveland.	Lee.	Union.
Columbus.	Lenoir.	Vance.
Craven.	Lincoln.	Wake.
Cumberland	McDowell.	Warren.
Davidson.	Madison.	Watauga.
Davie.	Martin.	Wayne.
Duplin.	Mecklenburg.	Wilkes.
Durham.	Nash.	Wilson.

TABLE No. 9.

ADDRESSES AND NAMES OF 90 RETAIL DEALERS IN 56 TOWNS, FROM WHOM VEGETABLE SEED SAMPLES WERE COLLECTED AND TESTED.

<i>Location.</i>	<i>Dealer.</i>
Asheboro	A. O. Free.
Asheville	Grant's Pharmacy.
Asheville	L. R. Stricker.
Brevard	Brevard Hardware Co.
Brevard	McAfee, Brodie Drug Co.
Burgaw	W. R. Harrell.
Canton	W. G. Cole.
Chadbourn	Brown Mercantile Co.
Claremont	J. W. Setzar.
Clinton	J. C. Peterson.
Columbia	Davis Brothers.
Dunn	W. O. Holland.
Elm City	George A. Barnes.
Elizabeth City	T. P. Nash.
Elizabeth City	W. S. White & Co.
Faison	I. P. Faison.
Fayetteville	A. S. Huske.
Gastonia	Lineberger Seed Co.
Goldsboro	B. G. Thompson.
Goldsboro	T. N. Waters & Bro.
Granite Falls	L. T. Sharp.
Greensboro	Carolina Warehouse Co.
Greensboro	Scott Seed Co.
Greenville	W. H. Allen.
Henderson	Dorsey Drug Co.
Henderson	W. W. Parker.
Hendersonville	Hunter's Pharmacy.
Hobgood	R. J. Shields.
Jacksonville	W. H. Horne & Sons.
Kinston	Dunn's Standard Drug Store.
Kinston	J. E. Hood & Co.
Kinston	Lenoir Drug Co.
Kinston	E. B. Marston Drug Co.
Kinston	Temple Drug Co.
Laurinburg	McLaurin & Shaw.
Lenoir	Harrison & Co.
Lewiston	W. S. Bazemore.
Lexington	R. L. Leonard.
Lexington	Smith Grocery Co.
Lincolnton	W. C. Asbury.
Lincolnton	Lincoln Drug Co.
Lincolnton	J. H. Rudisill & Co.
Maxton	J. W. Carter & Co.
Maxton	Pace Grocery Co.
Monroe	Simpson's Drug Store.
Morganton	L. A. Kincaid.
Morganton	W. A. Leslie.
Morganton	T. C. Morgan & Co.
Mount Olive	W. P. Kornegay.
Mount Olive	M. W. Pope.
Murfreesboro	T. H. Nicholson.
Murphy	R. H. Hyatt & Co.
Nashville	Nash Supply Co.
Nashville	J. O. Winstead.

<i>Location.</i>	<i>Dealer.</i>
New Bern	J. F. Clarke.
New Bern	A. S. Spencer.
New Bern	J. C. Whitty & Co.
Newton	Freeze Drug Co.
North Wilkeshoro	Miller Grocery Co.
Oxford	J. G. Hall.
Raleigh	S. J. Adams.
Raleigh	F. W. Parker Drug Co.
Raleigh	F. W. Woolworth Co.
Red Springs	Red Springs Drug Co.
Rocky Mount	J. W. Davenport.
Rocky Mount	H. C. Joyner.
Rose Hill	R. D. Usher.
Salisbury	W. L. Klutz.
Shelby	H. E. Kendall.
Shelby	J. E. Webb.
Shelby	Paul Webb.
Southport	P. O. Leggett.
Southport	Watson's Pharmacy Co.
Tarboro	R. E. L. Cook.
Tarboro	Cumming's Grocery Co.
Tryon	John L. Jackson Co.
Vineland	Powell & Co.
Vineland	Vineland Dry Goods Co.
Wadesboro	M. A. Gilmore & Co.
Wadesboro	W. N. Jeans.
Wadesboro	Parson's Drug Co.
Warsaw	Chas. L. Johnson.
Washington	E. P. Carter & Co.
Wilmington	R. R. Bellamy.
Wilmington	W. J. Kirkham & Co.
Wilson	Ruffin-High Co.
Wilson	J. D. Williams.
Winston-Salem	Farmers' Union Agency.
Winston-Salem	Riggins Feed & Seed Co.

TABLE No. 10.

VEGETABLE SEEDS FROM THE FOLLOWING 16 WHOLESALE DEALERS WERE
COLLECTED FROM THE NORTH CAROLINA MARKET AND TESTED.

<i>Dealer.</i>	<i>Location.</i>
American Seed Co.	Detroit, Mich.
Barnard, W. W., & Co.	Chicago, Ill.
Buist, Robert, Co.	Philadelphia, Pa.
Clark, Everett B., Seed Co.	Milford, Conn.
Crosman Bros. Co.	Rochester, N. Y.
Diggs & Beadles	Richmond, Va.
Ferry, D. M., & Co.	Detroit, Mich.
Griffith & Turner Co.	Baltimore, Md.
Lake Shore Seed Co.	Dunkirk, N. Y.
Landreth, D., Seed Co.	Bristol, Pa.
Leonard Seed Co.	Chicago, Ill.
Louisville Seed Co.	Louisville, Ky.
Rice, J. B., Seed Co.	Cambridge, N. Y.
Slate Seed Co.	South Boston, Va.
Wood, Stubbs & Co.	Louisville, Ky.
Wood, T. W., & Sons	Richmond, Va.

TABLE No. 11.

VEGETABLE SEED SAMPLES WERE COLLECTED IN THE FOLLOWING
FORTY-SEVEN COUNTIES.

Anson.	Forsyth.	Pitt.
Beaufort.	Gaston.	Polk.
Bertie.	Granville.	Randolph.
Brunswick.	Guilford.	Robeson.
Buncombe.	Halifax.	Rowan.
Burke.	Harnett.	Sampson.
Catawba.	Haywood.	Scotland.
Caldwell.	Henderson.	Transylvania.
Cherokee.	Hertford.	Tyrrell.
Cleveland.	Lenoir.	Union.
Columbus.	Lincoln.	Vance.
Craven.	Nash.	Wake.
Cumberland.	New Hanover.	Wayne.
Davidson.	Onslow.	Wilkes.
Duplin.	Pasquotank.	Wilson.
Edgecombe.	Pender.	

TABLE XII.—RESULTS OF TESTS OF 26 KINDS OF AGRICULTURAL SEEDS, 576 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 1, 1915, TO JULY 1, 1916.

Laboratory Number	Kind of Seed and Name of Chaffed Seed Present	Wholesale Dealer	Retail Dealer	Pure Cent of Seed	Per Cent of Inert Matter	Per Cent of Foreign Seed	Per Cent of Germination
7665	ARPAVA.....	Carter, Venable & Co., Richmond, Va.....	W. H. Allen, Greenville, N. C.....	86.78	.85	12.37	89.0
7406	do.....	Diggs & Beaulles, Richmond, Va.....	Hadley-Harris Co., Wilson, N. C.....	99.92	.06	.02	89.5
7484	do.....	Durham Seed House, Durham, N. C.....	Catawba County Farmers' Union Warehouse Co., Newton, N. C.....	99.62	.20	.18	91.5
7485	do.....	Kirby Seed Co., Gaffney, S. C.....	Lincoln Farmers' Union Warehouse Co., Lincolnton, N. C.....	99.63	.25	.12	91.0
7555	do.....	Louisville Seed Co., Louisville, Ky.....	Penry Grocery Co., Lexington, N. C.....	99.66	.16	.18	86.0
7462	do.....	Wm. G. Scarlett & Co., Baltimore, Md.....	West Jefferson Hardware and Supply Co., West Jefferson, N. C.....	97.59	.64	1.67	82.0
7848	do.....	T. W. Wood & Sons, Richmond, Va.....	Brevard Hardware Co., Brevard, N. C.....	99.52	.47	.01	90.0
7536	do.....	do.....	Farmers' Union Agency Co., Winston-Salem, N. C.....	99.50	.38	.12	82.0
7557	do.....	do.....	J. F. Fulton, Greensboro, N. C.....	99.90	.08	.02	89.0
7558	do.....	do.....	J. T. Turner, Asheboro, N. C.....	99.18	.27	.25	86.0
7576	do.....	do.....	W. S. White & Co., Elizabeth City, N. C.....	99.79	.19	.02	82.0
7507	do.....	do.....	Winslow & Allen, Greenville, N. C.....	99.74	.24	.02	88.5
7549	do.....	Dealer not given.....	L. R. Stricker, Asheville, N. C.....	99.78	.19	.03	89.0
7753	BARLEY.....	T. W. Wood & Sons, Richmond, Va.....	Lineberger Seed Co., Gastonia, N. C.....	98.98	.26	.76	165.5
7755	BEANS, SOJA.....	Hickory Seed Co., Hickory, N. C.....	Farmers' Union Warehouse Co., Morganton, N. C.....				63.0
7668	do.....	T. W. Wood & Sons, Richmond, Va.....	Ruffin-High Co., Wilson, N. C.....				92.0
7843	BLUE GRASS, KENTUCKY.....	S. T. Beveridge & Co., Richmond, Va.....	J. H. Ditmore, Bryson City, N. C.....	83.02	16.39	.59	45.5

7565	do.	Piggs & Beadles, Richmond, Va.	Carolina Warehouse Co., Greensboro, N. C.	*76.39	22.22	.79	66.5
7674	do.	do.	F. W. Parker Drug Co., Raleigh, N. C.	80.32	19.01	.67	122.0
7457	do.	Hamilton, Bacon & Hamilton, Bristol, Tenn.	*Ashe Supply and Hardware Co., West Jefferson, N. C.	*71.93	24.58	.49	131.0
7839	do.	Hardin, Hamilton & Lewman, Louisville, Ky.	John E. Fain, Murphy, N. C.	*69.38	30.34	.28	129.5
7895	do.	do.	W. M. Nod & Co., Mooresville, N. C.	*70.61	26.94	2.42	114.5
7836	do.	D. Landreth Seed Co., Bristol, Pa.	Grant's Pharmacy, Asheville, N. C.	*74.88	24.93	1.9	118.0
7842	do.	Louisville Seed Co., Louisville, Ky.	W. J. Gudger & Sons, Marshall, N. C.	81.50	16.40	.40	112.5
7844	do.	do.	Houston & Son, Hendersonville, N. C.	*72.49	26.44	1.07	111.0
7840	do.	do.	R. H. Hyatt & Co., Murphy, N. C.	83.18	15.61	.88	128.5
7627	do.	National Seed Co., Louisville, Ky.	Farmers' Union Agency Co., Winston-Salem, N. C.	*77.68	24.72	.56	112.5
7458	do.	Philadelphia Seed Co., Philadelphia, Pa.	J. E. Sloop, Statesville, N. C.	*92.43	37.77	.40	73.0
7621	do.	Roanoke Seed and Supply Co., Roanoke, Va.	J. F. Fulton, Greensboro, N. C.	83.46	16.03	.81	122.0
7456	do.	Wm. G. Scarlett & Co., Baltimore, Md.	M. B. Blackburn, Boone, N. C.	85.91	13.79	.39	81.5
7626	do.	Slate Seed Co., South Boston, Va.	Riggins Food and Seed Co., Winston-Salem, N. C.	83.36	15.38	1.26	88.5
7845	do.	Shayden, Fakes & Co., Asheville, N. C.	W. H. McClure, Hazledwood, N. C.	*63.54	35.97	.4	121.5
7567	do.	Smith Seed and Feed Co., Danville, Va.	Hazell & Mims, Reidsville, N. C.	86.15	13.55	1.0	79.0
7341	do.	L. R. Stricker, Asheville, N. C.	G. L. Hampton, Canton, N. C.	84.48	16.94	.48	60.5
7841	do.	do.	Sylvia Supply Co., Sylva, N. C.	*78.79	29.56	.65	122.0
7494	do.	T. W. Wood & Sons, Richmond, Va.	Gaston Seed and Provision Co., Gastonia, N. C.	85.21	14.20	.59	75.0
7754	do.	do.	W. A. Leslie, Morganton, N. C.	80.54	19.08	.38	115.0
7340	do.	do.	Leslie's Drug Store, Morganton, N. C.	*79.40	20.23	.67	77.5
7495	do.	do.	Lincoln Farmer's Union Warehouse Co., Lincolnton, N. C.	84.57	15.52	.86	62.5
7460	do.	do.	F. Miller, Laurel Springs, N. C.	83.79	15.93	.8	79.5

TABLE XII.—RESULTS OF TESTS OF 26 KINDS OF AGRICULTURAL SEEDS, 576 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 1, 1915, TO JULY 1, 1916—CONTINUED.

Lab- oratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pure Cent of Inert Matter	Per Cent of Foreign Seed	Per Cent of Germination
7566	BLUE GRASS, KENTUCKY	T. W. Wood & Sons, Richmond, Va.	S. L. Owen, Lexington, N. C.	79.32	20.28	40
7565	do	Kentucky grown	Scott Seed Co., Greensboro, N. C.	86.70	12.92	38
7439	do	Dealer not given	Hickory Seed Co., Hickory, N. C.	76.52	22.70	58
7537	do	do	T. S. Morrison & Co., Asheville, N. C.	81.22	15.40	38
7342	do	do	do	80.03	19.28	69
7538	do	do	L. R. Stricker, Asheville, N. C.	78.03	21.23	74
7667	CASE	T. W. Wood & Sons, Richmond, Va.	Ruffin-High Co., Wilson, N. C.	98.08	1.32	40
7564	CLOVER, ALABAMA	S. T. Beveridge & Co., Richmond, Va.	Piedmont Feed Store, Winston-Salem, N. C.	98.87	.49	61
7561	do	Roanoke Seed and Supply Co., Roanoke, Va.	Carolina Warehouse Co., Greensboro, N. C.	94.36	1.02	4.62
7461	do (double)	do	Farmers' Union Agency Co., Winston-Salem, N. C.	98.12	1.20	38
7563	do	do	do	96.03	.59	3.38
7562	do	T. W. Wood & Sons, Richmond, Va.	J. T. Turner, Asheville, N. C.	98.95	.30	75
7330	do	Dealer not given	L. R. Stricker, Asheville, N. C.	96.95	.82	2.23
7335	CLOVER, CURTIS	S. T. Beveridge & Co., Richmond, Va.	Jonathan Havens, Washington, N. C.	96.61	2.59	80
7365	do	do	J. R. Smith & Co., Ayden, N. C.	98.14	.39	57
7465	do	Blamberg Bros., Baltimore, Md.	Johnston Bros., Charlotte, N. C.	97.97	1.60	43
7514	do	J. J. Buffington & Co., Baltimore, Md.	Lexington Hardware Co., Lexington, N. C.	98.00	1.54	46
7364	do	do	W. S. White & Co., Elizabeth City, N. C.	96.85	2.41	74

7373	do	Cartier, Vendable & Co., Richmond, Va.	J. G. Barbour & Sons, Clayton, N. C.	97.55	1.93	.52	133.5
7374	do	do	Farmers' Union Agency Co., Winston-Salem, N. C.	97.06	.55	2.19	133.0
7510	do	Diggs & Bradles, Richmond, Va.	Carolina Warehouse Co., Greensboro, N. C.	95.42	3.77	.81	89.5
7515	do	do	do	97.97	.82	1.21	123.5
7474	do	do	Davidson & Wolfe, Charlotte, N. C.	98.31	.18	1.21	158.5
7467	do	do	F. H. Dunn, Mount Holly, N. C.	97.32	2.11	.54	91.5
7512	do	do	J. F. Fulton, Greensboro, N. C.	95.92	2.33	1.55	97.0
7358	do	do	Hadley-Harris Co., Wilson, N. C.	96.72	1.93	1.35	88.5
7366	do	do	H. C. Joyner, Rocky Mount, N. C.	93.67	5.11	1.22	80.5
7516	do	do	Scott Seed Co., Greensboro, N. C.	96.78	1.49	1.73	91.0
7508	do	do	W. P. Ware, Reidsville, N. C.	97.69	.81	1.59	173.5
7509	do	do	do	95.78	2.97	1.25	92.5
7406	do	Durham Seed House, Durham, N. C.	Catawba County Farmers' Warehouse Co., Newton, N. C.	97.22	1.81	.97	89.0
7323	do	Hardin, Hamilton & Lewman, Louisville, Ky.	John E. Fain, Murphy, N. C.	97.41	1.62	.96	149.5
7357	do	I. L. Radwauer, New York, N. Y.	W. J. Kirkham & Co., Wilmington, N. C.	97.74	1.68	.58	143.5
7507	do	N. R. Savage & Son, Richmond, Va.	Hazell & Mims, Reidsville, N. C.	97.60	.95	1.45	179.0
7426	do	do	W. S. Linville & Son, Kernersville, N. C.	96.42	2.91	.67	97.0
7513	do	do	Perry Grocery Co., Lexington, N. C.	98.51	1.11	.38	97.5
7425	do	do	C. C. Sanford's Sons Co., Mocksville, N. C.	96.97	1.11	1.92	169.0
7427	do	Wm. G. Scarlett & Co., Baltimore, Md.	M. B. Blackburn, Boone, N. C.	97.86	1.79	.35	95.0
7321	do	do	Boyd Feed Co., Hickory, N. C.	96.52	2.13	1.35	181.0
7322	do	do	Byers Bros., Hendersonville, N. C.	97.48	2.02	.50	96.0
7362	do	do	Doane Herring, Wilson, N. C.	97.58	1.61	.81	173.0
7367	do	do	C. B. Hill, New Bern, N. C.	97.47	1.87	.66	88.5

TABLE XII RESULTS OF TESTS OF 26 KINDS OF AGRICULTURAL SEEDS, 576 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 1, 1905, TO JULY 1, 1906 CONTINUED.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pure Seed, Per Cent of	Inert Matter, Per Cent of	Foreign Seed, Per Cent of	Per Cent of Germination
7374	CLOVER, CRIMSON	Wm. G. Scurlett & Co., Baltimore, Md.	Nash Supply Co., Nashville, N. C.	98.11	1.00	.89	774.0
7506	do.	do.	C. H. Pettigrow, Reidsville, N. C.	*96.59	2.61	.80	91.0
7372	do.	do.	J. D. Winstead, Nashville, N. C.	*96.98	2.29	.73	92.0
7359	do.	Slate Seed Co., South Boston, Va.	E. B. Marston Drug Co., Kingston, N. C.	97.64	1.82	.54	74.0
7368	do.	do.	Ruffin-High Co., Wilson, N. C.	*96.92	2.35	.73	175.0
7473	do.	T. W. Wood & Sons, Richmond, Va.	F. B. Ashcraft, Monroe, N. C.	97.56	1.77	.67	89.0
7325	do.	do.	J. D. Blanton, Marion, N. C.	97.69	1.63	.68	88.0
7324	do.	do.	Brevard Hardware Co., Brevard, N. C.	*97.44	1.82	.74	88.0
7326	do.	do.	City Feed Co., Hickory, N. C.	97.24	1.16	1.60	158.0
7469	do.	do.	Fox & Lyon, Wadesboro, N. C.	98.33	1.21	.43	91.5
7470	do.	do.	Gaston Seed and Provision Co., Gastonia, N. C.	*97.16	1.17	1.67	170.0
7472	do.	do.	do.	*96.77	4.28	.95	91.0
7356	do.	do.	J. E. Hood & Co., Kingston, N. C.	*97.30	1.87	.83	90.5
7370	do.	do.	J. B. Johnston, Greenville, N. C.	*96.32	3.08	.60	91.0
7371	do.	do.	King Cooperative Co., Nashville, N. C.	*96.01	2.58	1.41	183.5
7471	do.	do.	Lincoln Farmers' Union Warehouse Co., Lincoln, N. C.	*94.69	4.56	.75	90.0
7505	do.	do.	S. L. Owen, Lexington, N. C.	*96.81	2.53	.66	90.5
7360	do.	do.	B. F. Powell, Clinton, N. C.	98.64	.67	.69	92.5

7643	do	do	H. C. Reece, Siler City, N. C.	96.36	3.01	63	92.0
7428	do	do	J. E. Sloop, Statesville, N. C.	97.16	1.86	98	88.5
7363	do	do	Spence & Hollowell, Elizabeth City, N. C.	97.99	1.15	56	93.5
7503	do	do	J. T. Turner, Asheville, N. C.	95.83	3.27	90	95.5
7504	do	do	do	98.88	.51	61	63.5
7376	do	do	B. H. B. Vector, Nashville, N. C.	97.25	2.30	15	96.5
7391	do	do	T. N. Waters & Bro., Goldsboro, N. C.	98.05	1.56	39	95.0
7468	do	do	J. E. Webb, Shelby, N. C.	96.22	1.80	198	671.5
7369	do	do	Winslow & Allen, Greenville, N. C.	96.40	3.24	36	92.0
7375	do	do	J. D. Winstead, Nashville, N. C.	95.84	.70	3.6	443.5
7429	do	do	Hickory Seed Co., Hickory, N. C.	98.10	1.14	576	966.0
7464	Clover, JAPAN	do	do	94.63	3.33	3.04	48.5
7534	do	do	L. R. Stricker, Asheville, N. C.	96.84	.83	2.34	12.0
7793	Clover, RED	do	J. H. Ditmore, Bryson City, N. C.	98.40	.95	65	88.5
7518	do	do	Dwiggins & Green, Mocksville, N. C.	98.40	.72	88	90.5
7529	do	do	Farmers' Cash Seed and Feed Co., Winston-Salem, N. C.	98.24	.88	.88	90.9
7527	do	do	do	95.06	3.31	1.60	87.5
7616	do	(Wild carrot)	do	97.70	1.31	.96	91.5
7391	do	do	J. J. Buflington & Co., Baltimore, Md.	97.37	.57	2.06	85.0
7577	do	(Wild carrot)	do	97.04	1.78	1.38	86.5
7789	do	do	Carter, Venable & Co., Richmond, Va.	97.26	1.61	1.13	91.5
7621	do	(Wild carrot)	do	96.80	1.28	1.92	93.5
7669	do	do	Diggs & Beadles, Richmond, Va.	98.47	1.04	.59	90.5
7189	do	do	Farmers' Supply Co., Charlotte, N. C.	95.80	2.43	1.77	676.5
7519	do	(Wild carrot)	J. F. Fulton, Greensboro, N. C.	97.71	.96	1.53	84.0

TABLE III—RESULTS OF TESTS OF 26 KINDS OF AGRICULTURAL SEEDS, 576 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 1, 1915, TO JULY 1, 1916—CONTINUED.

Laboratory	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pure Seed Per Cent of	Per Cent of Inert Matter	Per Cent of Foreign Seed	Per Cent of Germination
7617	CLOVER, RED.....	Diggs & Beadles, Richmond, Va.	J. F. Fulton, Greensboro, N. C.	99.06	.44	.50	91.9
7396	do.....	do.....	Hadley-Harris Co., Wilson, N. C.	96.99	1.51	1.59	87.5
7620	do.....	do.....	Scott Seed Co., Greensboro, N. C.	96.55	1.34	2.11	84.0
7787	do.....	Hackney, Broyles & Lackey, Knoxville, Tenn.	Bly Hardware Co., Hendersonville, N. C.	97.45	1.67	.88	89.5
7802	do.....	do.....	R. N. Ranney, Marshall, N. C.	97.37	1.77	.86	81.5
7803	do.....	do.....	do.....	98.12	1.11	.77	83.5
7433	do.....	Hamilton, Bacon & Hamilton, Bristol, Tenn.	Ashe Supply and Hardware Co., West Jefferson, N. C.	96.76	1.47	1.81	95.5
7435	do.....	do.....	W. S. Miller & Co., Todd, N. C.	97.66	1.18	1.16	85.5
7329	do.....	Hardin, Hamilton & Lewman, Louisville, Ky.	City Feed Co., Hickory, N. C.	97.80	1.13	1.07	83.0
7331	do.....	do.....	John E. Fain, Murphy, N. C.	98.30	.90	.80	81.0
7797	do.....	do.....	do.....	98.03	.61	1.33	93.5
7573	do.....	do.....	W. P. Ware, Reidsville, N. C.	97.13	.84	2.03	85.0
7801	do.....	Louisville Seed Co., Louisville, Ky.	W. J. Gudger & Son, Marshall, N. C.	95.69	1.15	3.16	88.0
7796	do.....	do.....	R. H. Hyatt & Co., Murphy, N. C.	97.24	1.18	1.58	92.0
7741	do.....	do.....	L. A. Kinraid, Morganton, N. C.	*87.65	2.40	9.95	83.0
7792	do.....	National Seed Co., Louisville, Ky.	D. K. Collins, Bryson City, N. C.	97.53	1.26	.91	88.0
7614	do.....	do.....	Farmers' Union Agency, Winston-Salem, N. C.	97.02	1.78	1.20	80.0

7491	do.	Philadelphia Seed Co., Philadelphia, Pa.	Davidson & Wolfe, Charlotte, N. C.	95.00	1.82	3.18	87.5
7498	(Wild carrot, Indian mustard.)	do.	do.	do.	do.	do.	do.
	do.	Ronoke Seed and Supply Co., Roanoke, Va.	Farmers' Union Agency Co., Winston-Salem, N. C.	99.75	.12	.10	87.5
7618	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	do.	J. F. Fulton, Greensboro, N. C.	97.61	1.28	1.11	81.5
7431	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	do.	E. L. Kier & Co., Rural Hall, N. C.	97.11	1.18	1.38	80.0
7874	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	do.	Mount Airy Feed Store, Mount Airy, N. C.	98.22	.89	.89	69.5
7873	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	N. R. Savage & Son, Richmond, Va.	C. Call, North Wilkesboro, N. C.	95.72	2.27	2.03	93.0
7871	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	do.	City Feed Co., Hickory, N. C.	98.53	1.02	.45	91.5
7872	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	do.	do.	97.18	1.23	1.29	96.0
7622	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	do.	High Point Hardware Co., High Point, N. C.	97.73	1.11	1.16	93.0
7520	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	do.	Lexington Hardware Co., Lexington, N. C.	98.31	.81	.88	90.0
7875	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	do.	W. E. Merritt & Co., Mount Airy, N. C.	97.49	1.21	1.39	82.5
7876	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	do.	do.	96.12	1.63	2.25	82.5
7430	do.	do.	do.	do.	do.	do.	do.
	(Wild mustard.)	do.	George Moose, Newton, N. C.	98.06	.76	1.17	86.5
7528	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	do.	C. C. Sanford's Sons Co., Mocksville, N. C.	80.26	3.75	6.99	81.0
7738	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	do.	J. E. Sloop, Statesville, N. C.	97.30	1.56	1.11	95.5
7492	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	Wm. G. Scarlett & Co., Baltimore, Md.	M. B. Blackburn, Boone, N. C.	98.08	1.16	.76	85.0
7327	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	do.	Boyd Feed Co., Hickory, N. C.	99.01	.51	.45	90.5
7328	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	do.	do.	99.48	.26	.26	88.5
7784	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	do.	S. E. Dilday, Aloskie, N. C.	98.51	.61	.82	90.0
7615	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	do.	Farmers' Cash Seed and Feed Co., Winston-Salem, N. C.	98.31	.87	.82	90.0
7742	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	do.	Farmers' Union Warehouse, Morganton, N. C.	98.51	.90	.59	93.5
7440	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	do.	E. A. McNeill, Jefferson, N. C.	98.96	.53	.51	61.00
7392	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	do.	T. P. Nash, Elizabeth City, N. C.	98.61	1.16	.23	85.0
7555	do.	do.	do.	do.	do.	do.	do.
	(Wild carrot.)	do.	C. H. Pettigrew, Reidsville, N. C.	99.30	.41	.29	90.0

TABLE NH—RESULTS OF TESTS OF 26 KINDS OF AGRICULTURAL SEEDS, 576 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 1, 1915, TO JULY 1, 1916—Continued.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pure (Tent of Seed)	Pot (Tent of Matter)	Pot (Tent of Foreign Seed)	Pot (Tent of Termination)
7623	CLOVER, RED (Dodder.)	Slate Seed Co., South Boston, Va.	Hood & Grandham, Dunn, N. C.	97.83	.52	1.65	430.0
7613	do (Wild carrot.)	do	Riggins Feed and Seed Co., Winston-Salem, N. C.	97.21	1.86	.93	93.5
7794	do (Dodder.)	L. R. Stricker, Asheville, N. C.	Holmes Bryson, Dillsboro, N. C.	98.41	.95	.61	478.5
7530	do (Dodder.)	do	Sylvia Supply Co., Sylva, N. C.	97.90	.58	1.52	86.5
7780	do (Wild carrot.)	do	do	97.92	1.51	.57	90.0
7791	do (Wild carrot.)	do	do	97.92	1.26	1.12	95.0
7639	do (Wild carrot.)	T. W. Wood & Sons, Richmond, Va.	W. H. Allen, Greenville, N. C.	99.41	.50	.96	90.5
7594	do	do	J. F. Bishop, Belhaven, N. C.	99.40	.25	.35	86.5
7740	do (Wild carrot.)	do	J. D. Blanton, Marion, N. C.	97.97	1.46	.87	96.0
7869	do	do	Boyd Feed Co., Hickory, N. C.	98.35	1.26	.39	96.5
7870	do	do	do	98.68	.53	.79	93.0
7524	do	do	Carolina Warehouse Co., Greensboro, N. C.	98.43	.60	1.27	89.0
7660	do	do	W. G. Egerton, Macon, N. C.	96.86	1.56	1.58	95.5
7436	do	do	Farmers' Union Agency Co., Winston-Salem, N. C.	98.79	.49	.72	92.5
7490	do	do	Fox & Lyon, Wadesboro, N. C.	98.91	.82	.23	84.5
7523	do	do	J. F. Fulton, Greensboro, N. C.	97.94	.80	1.26	87.0
7488	do	do	Gaston Seed and Provision Co., Gastonia, N. C.	97.65	1.32	1.03	87.0

7520	do (Wild carrot)	do	Hazell & Mims, Reidsville, N. C.	99.26	.41	.33	91.0
7588	do (Wild carrot)	do	Houston & Son, Hendersonville, N. C.	98.24	1.00	.76	91.5
7586	do (Wild carrot)	do	Hyatt & Co., Waynesville, N. C.	98.39	1.18	.41	93.0
7544	do (Wild carrot)	do	Linsenger Seed Co., Gastonia, N. C.	98.44	1.10	.47	96.0
7595	do	do	W. H. McClure, Hazelwood, N. C.	98.02	.71	.67	97.0
7437	do	do	W. R. McNall, Laurel Springs, N. C.	99.08	.12	.20	84.0
7670	do	do	W. A. Myatt, Raleigh, N. C.	98.82	.75	.43	95.5
7517	do (Wild carrot)	do	S. L. Owen, Lexington, N. C.	98.77	.64	.59	85.0
7522	do	do	do	99.38	.30	.32	89.5
7649	do	do	H. C. Reece, Silver City, N. C.	98.89	.26	.85	93.5
7543	do	do	M. C. Ratly, Salisbury, N. C.	98.28	.97	.75	95.0
7539	do	do	Sherill & Reece, Statesville, N. C.	98.99	.76	.25	90.5
7521	do	do	J. T. Turner, Ashboro, N. C.	97.48	1.26	1.26	88.0
7595	do	do	B. H. B. Vester, Nashville, N. C.	97.86	1.31	.87	91.5
7487	do	do	J. E. Webb, Shelby, N. C.	99.48	.43	.29	92.5
7593	do	do	Wanslow & Allen, Greensville, N. C.	99.39	.44	.18	88.0
7572	do	do	Darham Seed House, Durham, N. C.	99.02	.48	.50	84.5
7434	do	do	Hickory Seed Co., Hickory, N. C.	99.88	.10	.02	96.5
7439	do	do	do	98.47	.54	.99	967.0
7534	do (Wild carrot)	do	T. S. Morrison & Co., Asheville, N. C.	98.28	1.31	.41	82.5
7800	do (Wild carrot)	do	do	97.71	1.48	.81	97.0
7532	do (Wild carrot)	do	I. R. Stricker, Asheville, N. C.	99.49	.29	.12	82.0
7533	do	do	do	99.65	.21	.14	98.5
7598	do (Wild carrot)	do	do	98.44	.90	.57	92.5
7599	do (Wild carrot)	do	do	97.89	1.49	.65	94.5

Imported

Dealer not given

TABLE NH.—RESULTS OF TESTS OF 26 KINDS OF AGRICULTURAL SEEDS, 576 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 1, 1915, TO JULY 1, 1916—CONTINUED.

Label Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pure Seed Per Cent of	Inert Matter Per Cent of	Foreign Seed Per Cent of	Germination Per Cent of
7550	CLOVER, SWEET	T. W. Wood & Sons, Richmond, Va.	Scott Seed Co., Greensboro, N. C.				12.5
7571	do.	do.	J. T. Turner, Ashboro, N. C.				2.0
7553	do.	Dealer not given.	L. R. Stricker, Asheville, N. C.				27.0
7405	CLOVER, WHITE	T. W. Wood & Sons, Richmond, Va.	J. F. Bishop, Belhaven, N. C.	97.39	2.13	.48	73.8
7551	do.	do.	Brevard Hardware Co., Brevard, N. C.	98.45	.39	1.16	47.5
7706	CORN, FIELD	Robert Buist Co., Philadelphia, Pa.	I. F. Faison, Faison, N. C.				100.0
7701	do.	Griffith & Turner Co., Baltimore, Md.	Red Springs Drug Co., Red Springs, N. C.				96.0
7578	do.	Jerome B. Rice Seed Co., Cambridge, N. Y.	T. N. Waters & Bro., Goldsboro, N. C.				181.0
7633	do.	Slate Seed Co., South Boston, Va.	Hood & Grantham, Dunn, N. C.				100.0
7634	do.	do.	Riggins Feed and Seed Co., Winston-Salem, N. C.				100.0
7853	do.	T. W. Wood & Sons, Richmond, Va.	Brevard Hardware Co., Brevard, N. C.				100.0
7702	do.	do.	J. W. Carter & Co., Maxton, N. C.				96.0
7703	do.	do.	W. R. Harrell, Burgaw, N. C.				98.0
7803	do.	do.	Harris & McNeely, Mooresville, N. C.				492.0
7636	do.	do.	H. E. Kendall, Shelby, N. C.				98.0
7707	do.	do.	P. O. Leggett, Southport, N. C.				186.0
7751	do.	do.	Linberger Seed Co., Gastonia, N. C.				192.0
7804	do.	do.	Miller Grocery Co., North Wilkesboro, N. C.				100.0
7704	do.	do.	Powell & Co., Vineland, N. C.				192.0

7666	do.	Robinson-Ruffin Co., Tarboro, N. C.	190.0
7785	do.	Wood-Stubbs & Co., Louisville, Ky.	186.0
7750	do.	L. A. Kincaid, Morganton, N. C.	94.0
7705	do.	Vineyard Dry Goods Co., Vineland, N. C.	184.0
7635	do.	J. E. Webb, Shelby, N. C.	92.0
7639	FESCUE, MEADOW	Farmers' Union Agency Co., Winston-Salem, N. C.	99.65
7569	do.	Randolph Supply Co., Asheboro, N. C.	93.92
7502	GRASS, ITALIAN RYE	Gaston Seed and Provision Co., Gastonia, N. C.	96.60
7818	GRASS, ORCHARD	J. H. Ditmore, Bryson City, N. C.	80.66
7820	do.	Houston & Son, Hendersonville, N. C.	49.84
7673	do.	W. A. Myatt, Raleigh, N. C.	50.25
7822	do.	R. N. Ramsey, Marshall, N. C.	61.00
7498	do.	Davidson & Wolfe, Charlotte, N. C.	71.39
7815	do.	Grant's Pharmacy, Asheville, N. C.	79.52
7823	do.	R. H. Hyatt & Co., Murphy, N. C.	68.90
7559	do.	Farmers' Union Agency Co., Winston-Salem, N. C.	50.62
7637	do.	do.	70.92
7445	do.	Arnold Quesinberry, Mount Airy, N. C.	73.63
7887	do.	C. Call, North Wilkesboro, N. C.	81.31
7727	do. (Cheat)	Catawba County Farmers' Union Warehouse Co., Newton, N. C.	64.10
7446	do.	George Moose, Newton, N. C.	73.03
7890	do.	Mount Airy Feed Store, Mount Airy, N. C.	72.88
7886	do.	W. M. Neal & Co., Mooresville, N. C.	73.66

TABLE NUMBER 4141 OF 10,841 OF 26 KINDS OF AGRICULTURAL SEEDS, 576 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 1, 1915, TO JULY 1, 1916. CONTINUED.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Per Cent of			
				Pure Seed	Imp. Matter	Foreign Seed	Per Cent of Purity
7141	GRASS, Orchard	Wm. G. Searles & Co., Baltimore, Md.	M. B. Blackburn, Boone, N. C.	81.42	15.81	2.21	89.0
7142	do	do	Farmers' Union Warehouse Co., Morganton, N. C.	76.71	22.67	59	78.5
7143	do	do	T. P. Nash, Elizabeth City, N. C.	72.90	21.25	2.87	162.5
7144	do	do	W. T. Sharp, Canton, N. C.	54.78	13.73	1.19	78.5
7145	do	Slate Seed Co., South Boston, Va.	Riggins Feed and Seed Co., Winston-Salem, N. C.	61.76	37.96	25	89.0
7146	do	L. R. Stricker, Asheville, N. C.	Sylvia Supply Co., Sylva, N. C.	66.11	10.66	23.23	118.0
7147	do	do	do	62.16	36.39	1.15	83.5
7148	do	T. W. Wood & Sons, Richmond, Va.	F. B. Ashcraft, Monroe, N. C.	79.28	19.89	83	87.0
7149	do	do	J. D. Blanton, Marion, N. C.	88.11	11.05	81	82.0
7150	do	do	Brevard Hardware Co., Brevard, N. C.	84.89	11.72	39	87.5
7151	do	do	Carolina Warehouse Co., Greensboro, N. C.	78.16	19.77	1.77	85.5
7152	do	do	Gaston Seed and Provision Co., Gastonia, N. C.	81.34	17.11	1.25	81.0
7153	do	do	J. O. Houston & Son, Hendersonville, N. C.	84.07	13.06	1.97	80.0
7154	do	do	Hyatt & Co., Waynesville, N. C.	66.82	31.52	1.66	83.5
7155	do	do	W. L. Klutz, Salisbury, N. C.	65.18	33.07	1.45	90.0
7156	do	do	W. A. Leslie, Morganton, N. C.	69.95	27.78	2.27	88.5
7157	do	do	Lincoln Farmers' Union Warehouse Co., Lincolnton, N. C.	73.20	21.24	2.56	88.0

7723	do	do	Lincolner Seed Co., Gastonia, N. C.	70.15	23.91	5.94	87.0
7747	do	do	W. R. McNeill, Laurel Springs, N. C.	88.79	10.46	1.05	81.5
7888	do	do	Miller Grocery Co., North Wilkesboro, N. C.	71.98	25.81	2.18	77.5
7889	do	do	Harrison & Co., Lenoir, N. C.	80.99	17.58	1.13	80.9
7341	do	do	T. K. Morrison & Co., Asheville, N. C.	96.14	38.11	.45	82.5
7817	do	do	do	78.94	20.19	.87	76.3
7816	do	do	L. R. Strucker, Asheville, N. C.	71.91	24.36	1.00	82.9
7675	do	do	E. W. Parker Drug Co., Raleigh, N. C.	98.70	92	.38	49.5
7855	do	do	Brevard Hardware Co., Brevard, N. C.	97.23	2.77		80.5
7752	do	do	Lincolner Seed Co., Gastonia, N. C.	96.49	3.42	.09	80.5
7806	do	do	L. T. Sharp, Granite Falls, N. C.	96.73	3.27		79.5
7891	Grass, Tall Oat	do	W. E. Merritt & Co., Mount Airy, N. C.	99.67	29.81	.52	96.5
7598	do	do	S. L. Owen, Lexington, N. C.	72.55	20.51	6.94	90.0
7716	do	do	Farmers' Union Warehouse Co., Morganton, N. C.	89.89	9.81	.30	135.0
7892	do	do	City Feed Co., Hickory, N. C.	86.81	9.25	3.91	76.0
7354	do	do	J. O. Houston & Son, Hendersonville, N. C.	81.56	17.20	1.24	80.0
7745	do	do	Lincoln Farmers' Union Warehouse Co., Lincoln, N. C.	82.22	12.25	5.53	158.5
7852	do	do	L. R. Strucker, Asheville, N. C.	51.50	16.00	32.50	126.0
7492	do	do	Jonathan Havens, Washington, N. C.	98.93	.43	.61	174.5
7722	do	do	Faison Drug Co., Faison, N. C.	97.14	2.86		72.0
7644	do	do	Hood & Granham, Dunn, N. C.	99.93	5.07		91.5
7719	do	do	J. E. Hood & Co., Kinston, N. C.	98.46	1.81		81.5
7657	do	do	Jeffreys & Sons, Goldsboro, N. C.	96.39	3.61		89.0
7720	do	do	W. D. Kelly, Clinton, N. C.	97.37	2.32	.11	82.0
7723	do	do	do				
7447	do	do	do				
7888	do	do	do				
7889	do	do	do				
7341	do	do	do				
7817	do	do	do				
7816	do	do	do				
7675	do	do	do				
7855	do	do	do				
7752	do	do	do				
7806	do	do	do				
7891	Grass, Tall Oat	do	do				
7598	do	do	do				
7716	do	do	do				
7892	do	do	do				
7354	do	do	do				
7745	do	do	do				
7852	do	do	do				
7492	do	do	do				
7722	do	do	do				
7644	do	do	do				
7719	do	do	do				
7657	do	do	do				
7720	do	do	do				

TABLE XII.—RESULTS OF TESTS OF 26 KINDS OF AGRICULTURAL SEEDS, 576 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 1, 1915, TO JULY 1, 1916—CONTINUED.

Lab- oratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pur- chase Price (Cent of Seed)	Pur- chase Price (Cent of Seed)	Pur- chase Price (Cent of Seed)	Pur- chase Price (Cent of Seed)	Pur- chase Price (Cent of Seed)	Pur- chase Price (Cent of Seed)
7721	MILLET, PEARL	T. W. Wood & Sons, Richmond, Va.	M. W. Pope, Mount Olive, N. C.	98.54	1.16	81.0			
7658	do.	do.	Ruffin-High Co., Wilson, N. C.	97.61	1.97	42			
7602	OATS	Adams Grain and Provision Co., Charlotte, N. C.	Atkins Bros., Lillingston, N. C.	91.32	4.30	78			
7550	do.	do.	W. S. Ashworth & Sons, Brevard, N. C.	96.79	2.39	82			
7676	do.	do.	H. C. Jarrell, Taber, N. C.	96.96	1.46	1.58			
7607	do.	do.	McMurry, Hull & Co., Shelby, N. C.	98.21	1.52	.27			
7682	do.	do.	H. G. Mumford & Co., Ayden, N. C.	96.30	2.45	1.25			
7767	do. (<i>Cheat</i> .)	do.	R. B. Peters Grocery Co., Tarboro, N. C.	95.97	2.21	1.79			
7538	do. (<i>Cheat</i> .)	Adams Grain and Provision Co., Richmond, Va.	Piedmont Feed Store, Winston-Salem, N. C.	88.61	6.86	4.53			
7540	do. (<i>Corn cockle, cheat, wild garlic</i> .)	do.	do.	98.03	.74	1.23			
7656	do.	S. T. Beveridge & Co., Richmond, Va.	Churchill & Co., Kinston, N. C.	94.93	4.27	.80			
7597	do. (<i>Cheat, corn cockle</i> .)	do.	Farmers' Cash Seed and Feed Co., Winston- Salem, N. C.	97.89	.40	1.71			
7839	do.	do.	Harrison & Co., Lenoir, N. C.	91.82	6.47	1.71			
7647	do.	do.	Harrison Bros. & Co., Williamston, N. C.	98.04	1.63	.33			
7768	do.	do.	R. B. Peters Grocery Co., Tarboro, N. C.	97.77	1.16	1.07			
7763	do.	Carter, Venable & Co., Richmond, Va.	J. L. Bailey, Elm City, N. C.	98.40	1.49	.11			
7680	do.	do.	P. R. Floyd, Fairmont, N. C.	95.43	4.22	.35			
7781	do.	do.	H. C. Joyner, Rocky Mount, N. C.	96.32	3.10	.58			

7773	do.....	Nash Supply Co., Nashville, N. C.....	98.41	1.35	.23	91.0
7864	do.....	Walker's Bargain House, Mocksville, N. C.....	*96.19	3.81	.....	98.5
7772	do.....	J. D. Winstead, Nashville, N. C.....	97.92	1.18	.90	181.5
7652	do.....	P. L. Woodard Co., Wilson, N. C.....	*97.34	2.38	.28	153.0
7539	do.....	Carolina Warehouse Co., Greensboro, N. C.....	97.51	1.91	.58	96.5
7599	(<i>Cheat</i>)	do.....	*96.45	3.45	.10	182.5
7604	do.....	do.....	*90.20	5.20	4.41	188.0
7594	do.....	E. P. Carter & Co., Washington, N. C.....	*96.89	2.63	.18	174.5
7856	do.....	Farmers' Cash, Seed and Feed Co., Winston-Salem, N. C.....	*94.24	2.88	2.88	98.5
7537	do.....	J. F. Fulton, Greensboro, N. C.....	99.20	.61	1.19	97.5
7598	(<i>Cheat, wild garlic, corn cockle</i>)	do.....	*96.15	1.59	2.35	179.0
7665	do.....	do.....	*96.83	3.09	.08	130.0
7608	do.....	do.....	*90.67	6.76	2.57	97.5
7650	do.....	Harris & Evans, Henderson, N. C.....	*96.95	2.63	.12	159.5
7776	do.....	Landis Grocery Co., Henderson, N. C.....	*96.18	3.57	.25	181.0
7777	do.....	do.....	*96.50	1.07	2.43	180.0
7590	(<i>Cheat, corn cockle</i>)	Spence & Hollowell, Elizabeth City, N. C.....	98.43	1.46	.11	96.5
7778	do.....	L. Thomas, Oxford, N. C.....	*94.01	1.06	4.90	184.0
7779	(<i>Cheat, corn cockle</i>)	do.....	99.37	.43	.20	124.5
7764	do.....	D. H. Dixon, Goldsboro, N. C.....	*97.31	2.35	.34	151.5
7762	do.....	Braswell, Daves & Co., Elm City, N. C.....	97.66	1.69	.65	162.0
7687	do.....	Butler & Honeycutt, Clinton, N. C.....	*95.67	1.21	.12	182.5
7696	do.....	C. A. Dawson & Bro., Kinston, N. C.....	*97.31	2.39	.27	158.5
7780	do.....	Dozier, Thorne & Co., Rocky Mount, N. C.....	97.54	2.13	.11	182.0
7646	(<i>Cheat</i>)	do.....	*96.69	2.46	.85	168.0

TABLE XII RESULTS OF TESTS OF 26 KINDS OF AGRICULTURAL SEEDS, 576 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 1, 1915, TO JULY 1, 1916. CONTINUED.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Per Cent of		
				Pure Seed	Port Cont of Inert Matter	Port Cont of Foreign Seed
7693	OATS	D. H. Dixon, Goldsboro, N. C.	A. H. Knowles & Co., Mount Olive, N. C.	97.40	2.61	.26
7688	do	do	D. M. Patrick & Co., Clinton, N. C.	97.71	2.13	.16
7677	do	do	Rose & Herring, Mount Olive, N. C.	95.91	2.96	1.10
7585	do	do	A. L. Spencer, New Bern, N. C.	99.11	4.12	1.17
7591	do <i>Chaff</i>	do	do	97.37	2.23	.40
7595	do	do	B. G. Thompson, Goldsboro, N. C.	96.11	3.57	.29
7697	do	do	do	95.41	4.55	.01
7671	do <i>Chaff</i>	Gillette Grain Co., Nashville, Tenn.	W. A. Myatt, Raleigh, N. C.	99.15	6.11	3.71
7672	do	do	do	96.17	3.83	-----
7651	do	do	S. L. Stedman & Co., Halifax, N. C.	95.81	3.91	.25
7679	do	D. L. Gore Co., Wilmington, N. C.	A. J. Floyd, Fairmont, N. C.	96.55	2.18	1.27
7691	do	do	W. A. Griffin, Fairmont, N. C.	96.25	3.75	-----
7698	do	Hall & Pearsall, Wilmington, N. C.	A. J. Floyd, Fairmont, N. C.	97.51	1.96	.50
7692	do	E. G. Hines, Goldsboro, N. C.	J. C. Russ, Warsaw, N. C.	97.20	2.80	-----
7683	do	do	J. P. Walters, LaGrange, N. C.	96.50	3.13	.39
7690	do	McNair & Pearsall, Wilmington, N. C.	Pender Cash Grocery Co., Burgaw, N. C.	95.53	2.89	1.58
7681	do <i>Wild oats</i>	do	Rogers & Waddell, Fair Bluff, N. C.	95.32	4.61	.97
7766	do	Mayo Milling Co., Richmond, Va.	W. S. Cook & Sons, Tarboro, N. C.	99.01	.96	-----
7774	do	do	Cokerell & Williams, Nashville, N. C.	94.86	4.71	.43

Per Cent of Germination

7655	do	do	Robinson Rulph Co., Tallboro, N. C.	99.72	7.88	.10	978.0
7612	do	do	J. H. Wheeler, Benson, N. C.	99.20	1.39	.41	981.0
7695	do	do	W. R. Harrell, Burgaw, N. C.	99.81	1.16		975.5
7775	do	do	King Cooperative Co., Nashville, N. C.	98.33	1.56	.11	91.5
7760	do	do	Engene Johnson, Lenoir, N. C.	98.12	1.71	.17	91.5
7761	do	do	do	97.01	2.72	.24	91.0
7769	do	do	Burroughs, Putman & Wheeler, Scotland Neck, N. C.	99.67	2.59	.74	89.5
7857	do	do	C. Call, North Wilkesboro, N. C.	97.10	2.68	.22	923.5
7858	do	do	do	98.42	1.18	.10	978.0
7771	do	do	Edwards & Co., Scotland Neck, N. C.	99.35	3.45	.29	95.5
7770	do	do	J. R. Jossy, Scotland Neck, N. C.	99.19	3.56	.25	92.5
7119	do	do	W. L. Klutz, Salisbury, N. C.	97.90	2.01		97.0
7861	do	do	Mount Ary Feed Store, Mount Ary, N. C.	98.39	1.16	.25	91.0
7862	do	do	do	98.22	1.17	.61	83.5
7866	do	do	W. M. Neal & Co., Mooresville, N. C.	98.05	1.73	.22	976.0
7867	do	do	do	99.83	.89	2.28	90.5
7868	do	do	do	99.63	3.06	1.31	86.5
7863	do	do	C. C. Santord's Sons Co., Mocksville, N. C.	99.88	2.25	.87	92.5
7731	do	do	J. L. Sloope, Statesville, N. C.	99.78	2.65	1.57	91.5
7765	do	do	R. S. Walls, Elm City, N. C.	97.21	2.58	.21	96.0
7758	do	do	J. R. Gilliam, Windsor, N. C.	99.90	2.88	.22	182.5
7756	do	do	W. H. Allen, Greensville, N. C.	99.11	3.29	1.27	86.5
7653	do	do	W. S. Clark & Sons, Tallboro, N. C.	99.73	3.68	.59	94.0
7651	do	do	do	97.91	1.10	.96	952.0
7699	do	do	Garrett & McNall, Red Springs, N. C.	99.32	1.91	2.71	659.0

TABLE XII.—RESULTS OF TESTS OF 26 KINDS OF AGRICULTURAL SEEDS, 576 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 1, 1915, TO JULY 1, 1916—CONTINUED.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pure Seed Per Cent of	Inert Matter Per Cent of	Foreign Seed Per Cent of	Germination Per Cent of
7757	OATS.....	W. R. Tait, Nashville, Tenn.....	Hadley-Harris Co., Wilson, N. C.....	95.41	2.26	2.30	182.5
7603	do.....	do.....	C. T. Johnson, Benson, N. C.....	96.11	3.29	.30	160.5
7648	do..... (<i>Wheat</i> .)	do.....	J. B. Johnston, Greenville, N. C.....	97.24	1.62	1.14	92.5
7678	do.....	do.....	H. G. Mumford Co., Ayden, N. C.....	98.27	1.42	.31	172.5
7609	do.....	do.....	J. H. Wheeler, Benson, N. C.....	98.45	1.23	.62	161.0
7476	do.....	T. W. Wood & Sons, Richmond, Va.....	F. B. Ashcraft, Monroe, N. C.....	97.71	1.70	.59	99.5
7477	do.....	do.....	do.....	98.12	1.80	.08	94.5
7478	do..... (<i>Wild garlic</i> .)	do.....	do.....	99.45	.55	.....	99.0
7480	do.....	do.....	do.....	98.86	.22	.92	95.0
7611	do..... (<i>Wheat, corn cockle</i> .)	do.....	Carolina Warehouse Co., Greensboro, N. C.....	98.68	1.32	.....	92.0
7759	do.....	do.....	J. B. Gilliam, Windsor, N. C.....	98.58	.32	1.10	90.5
7450	do.....	do.....	Harris & McNelly Co., Mooresville, N. C.....	97.48	.66	1.86	95.0
7865	do..... (<i>Wheat, corn cockle</i> .)	do.....	do.....	98.79	.81	.40	182.5
7600	do.....	do.....	W. D. Holland, Dunn, N. C.....	98.56	1.26	.18	99.0
7601	do.....	do.....	A. S. Huske, Fayetteville, N. C.....	99.33	.31	.36	186.5
7606	do..... (<i>Wheat, corn cockle</i> .)	do.....	do.....	98.90	.41	.69	185.5
7610	do.....	do.....	do.....	97.55	2.45	.....	99.5
7689	do.....	do.....	W. D. Kelly, Clinton, N. C.....	96.35	3.52	.13	187.0
7729	do.....	do.....	W. A. Leslie, Morganton, N. C.....	98.00	1.04	.96	93.5

7479	do	do	Lincoln Farmers' Union Warehouse Co., Lincolnton, N. C.	99.28	.72	99.0
7732	do	do	Lindberger Seed Co., Gastonia, N. C.	98.41	1.78	91.0
7557	do	do	T. P. Nash, Elizabeth City, N. C.	99.31	.69	88.5
7588	do	do	do	98.68	1.10	97.0
7589	do	do	do	97.98	.67	180.0
7684	do	do	Z. M. L. Peacock, Fremont, N. C.	98.77	1.08	89.5
7685	do	do	B. F. Powell, Clinton, N. C.	98.82	.51	67
7686	do	do	do	98.98	.70	32
7730	do	(<i>Cheat</i>)	M. C. Ruffy, Salisbury, N. C.	97.72	2.41	17
7649	do	do	E. B. Stallings, Macon, N. C.	99.49	.44	89.5
7448	do	(<i>Cheat</i>)	S. W. V. Supply Co., Elkin, N. C.	98.31	.42	1.27
7541	do	do	J. T. Turner, Ashboro, N. C.	98.65	1.23	.42
7860	do	do	Wood, Stubbs & Co., Louisville, Ky.	99.46	.40	121.0
7586	do	do	Dealer not given	95.75	3.21	1.01
7592	do	(<i>Cheat</i>)	J. A. Meadows, New Bern, N. C.	98.42	1.58	92.5
7593	do	do	do	97.92	2.08	81.0
7596	do	do	Wilson & Hill, Warsaw, N. C.	97.59	2.21	17
7574	do	Georgia Oats	Durham Seed House, Durham, N. C.	97.49	2.81	88.5
7397	do	North Carolina Oats	D. L. Gore Co., Wilmington, N. C.	96.51	2.98	51
7400	do	(<i>Cheat</i>)	do	97.98	1.93	.09
7398	do	Tennessee Oats	do	95.42	4.47	1.41
7694	do	do	Wilson & Hill, Warsaw, N. C.	98.04	1.73	.23
7399	do	Texas Oats	D. L. Gore Co., Wilmington, N. C.	98.81	1.07	.42
7475	do	do	Johnston Bros., Charlotte, N. C.	97.22	2.57	.21
7753	RAPE	S. T. Beveridge & Co., Richmond, Va.	S. J. Stallings, Littleton, N. C.	99.80	.49	96.5

TABLE XII.—RESULTS OF TESTS OF 26 KINDS OF AGRICULTURAL SEEDS, 576 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 1, 1905, TO JULY 1, 1916—Continued.

Subsidiary Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pure Seed, Per Cent of	Per Cent of Inert Matter	Per Cent of Foreign Seed	Per Cent of Germination
7354	Rape	S. T. Beveridge & Co., Richmond, Va.	Wilson & Hill, Warsaw, N. C.	99.31	69		91.5
7379	do	J. J. Buflington & Co., Baltimore, Md.	W. S. White & Co., Elizabeth City, N. C.	99.66	31		91.5
7389	do	Robert Buist Co., Philadelphia, Pa.	Y. H. Knowles Co., Mount Olive, N. C.	99.15	55		90.0
7628	do	Diggs & Beadles, Richmond, Va.	J. F. Fulton, Greensboro, N. C.	99.78	42		88.0
7385	do	do	Hadley, Harris & Co., Wilson, N. C.	99.15	85		92.0
7715	do	do	W. P. Kornegay, Mount Olive, N. C.	99.12	58		96.0
7579	do	do	T. N. Waters & Bro., Goldsboro, N. C.	99.92	98		98.0
7553	do	Reynolds Seed and Supply Co., Roanoke, Va.	Farmers' Cash Seed and Feed Co., Winston-Salem, N. C.	98.96	1.04		93.5
7381	do	Wm. G. Seabolt & Co., Baltimore, Md.	Doane Herring, Wilson, N. C.	98.79	1.21		97.0
7629	do	do	A. S. Huske, Fayetteville, N. C.	99.28	7.2		92.5
7752	do	do	H. C. Joyner, Rocky Mount, N. C.	99.91	99		99.0
7718	do	do	H. G. Mumford Co., Ayden, N. C.	99.92	38		98.0
7377	do	do	T. P. Nash, Elizabeth City, N. C.	99.17	46	37	93.5
7631	do	do	Wilkins, Ricks & Co., Sanford, N. C.	99.19	51		97.0
7632	do	Shane Seed Co., South Boston, Va.	Riggins Feed and Seed Co., Winston-Salem, N. C.	99.73	27		95.0
7382	do	T. W. Wood & Sons, Richmond, Va.	S. W. Anan & Sons, Jacksonville, N. C.	99.08	92		89.5
7846	do	do	Brevard Hardware Co., Brevard, N. C.	99.00	99	91	98.5
7501	do	do	Fox & Lyon, Wadesboro, N. C.	99.36	61		93.5

7381	do	do	J. E. Hood & Co., Kingston, N. C.	99.63	.37	97.5
7714	do	do	do	98.43	1.57	98.0
7580	do	do	W. H. Horne & Co., Jacksonville, N. C.	99.64	.36	98.0
7386	do	do	J. B. Johnston, Greenville, N. C.	98.76	1.24	186.0
7390	do	do	W. D. Kelly, Clinton, N. C.	99.29	.71	89.5
7713	do	do	do	99.82	.18	98.5
7662	do	do	Lenoir Drug Co., Kingston, N. C.	99.86	.14	98.5
7711	do	do	D. M. Patrick & Co., Clinton, N. C.	99.81	.19	91.5
7708	do	do	J. C. Peterson, Clinton, N. C.	99.74	.26	98.5
7716	do	do	M. W. Pope, Mount Olive, N. C.	99.56	.44	98.5
7712	do	do	B. F. Powell, Clinton, N. C.	99.85	.15	99.5
7717	do	do	Red Springs Drug Co., Red Springs, N. C.	99.69	.31	98.5
7710	do	do	Register Bros., Clinton, N. C.	99.56	.63	95.0
7663	do	do	S. M. Schulz, Greenville, N. C.	99.80	.29	98.5
7380	do	do	Temple Drug Co., Kingston, N. C.	99.46	.45	99.0
7552	do	do	J. T. Turner, Asheville, N. C.	99.49	.58	94.5
7378	do	do	B. H. B. Vester, Nashville, N. C.	99.83	.17	96.5
7709	do	do	Vineyard Dry Good. Co., Vineyard, N. C.	99.68	.32	92.5
7551	do	do	W. P. Ware, Reidsville, N. C.	99.60	.35	92.0
7554	do	do	J. F. Fulton, Greensboro, N. C.	98.78	1.22	96.5
7661	do	do	W. W. Parker, Henderson, N. C.	99.80	.29	96.0
7630	do	do	Peacock Drug Co., Benson, N. C.	99.57	.63	97.5
7847	do	do	E. R. Stricker, Asheville, N. C.	99.73	.26	89.0
7575	do	do	Durham Seed House, Durham, N. C.	99.42	.87	98.0
7899	Editor	do	J. H. Dittmore, Bryson City, N. C.	99.46	1.67	73.8
7181	do	do	Davidson & Wolfe, Charlotte, N. C.	99.48	1.46	90.5

Wood, Stubbs & Co., Louisville, Ky.

Dealer not given

Imported

S. T. Beveridge & Co., Richmond, Va.

J. J. Ballington & Co., Baltimore, Md.

TABLE XI - RESULTS OF TESTS OF 26 KINDS OF AGRICULTURAL SEEDS, 576 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 1, 1915, TO JULY 1, 1916 (CONTINUED).

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Per Cent of			
				Pure Seed	Inert Matter	Foreign Seed	Germination
7583	Redtop	J. J. Buffington & Co., Baltimore, Md.	W. S. White, Elizabeth City, N. C.	85.64	9.77	1.59	83.0
7814	do.	Carter, Venable & Co., Richmond, Va.	Houston & Son, Hendersonville, N. C.	92.68	6.25	1.07	88.0
7584	do.	Diggs & Beadles, Richmond, Va.	E. P. Carter & Co., Washington, N. C.	91.06	6.56	2.38	89.5
7592	do.	do.	W. P. Ware, Roidsville, N. C.	83.07	8.03	8.90	86.8
7806	do.	Hackney, Broyles & Lackey Co., Knoxville, Tenn.	R. N. Ramsey, Marshall, N. C.	90.42	6.10	3.48	82.5
7454	do.	Hamilton, Bacon & Hamilton Co., Bristol, Tenn.	W. S. Miller & Co., Todd, N. C.	96.43	3.37	.20	91.8
7810	do.	Hardin, Hamilton & Lewman, Louisville, Ky.	John E. Fain, Murphy, N. C.	93.96	5.27	.77	79.3
7813	do.	do.	Hunter's Pharmacy, Hendersonville, N. C.	86.52	10.75	2.73	81.5
7812	do.	Louisville Seed Co., Louisville, Ky.	Houston & Son, Hendersonville, N. C.	69.45	19.58	10.97	78.0
7811	do.	do.	R. H. Hyatt & Co., Murphy, N. C.	93.94	5.02	1.04	78.5
7808	do.	National Seed Co., Louisville, Ky.	D. K. Collins, Bryson City, N. C.	92.36	6.41	1.23	74.0
7544	do.	Roanoke Seed and Supply Co., Roanoke, Va.	Farmers' Cash Seed and Feed Co., Winston-Salem, N. C.	90.26	7.75	1.99	92.0
7543	do.	do.	Farmers' Union Agency Co., Winston-Salem, N. C.	89.32	8.45	2.23	95.0
7455	do.	do.	Arnold Quesinberry, Mount Airy, N. C.	91.41	7.00	1.56	92.8
7877	do.	N. R. Savage & Son, Richmond, Va.	C. Call, North Wilkesboro, N. C.	93.80	5.44	.76	83.3
7881	do.	do.	W. E. Merritt & Co., Mount Airy, N. C.	69.11	20.81	10.05	85.5
7451	do.	do.	George Moose, Newton, N. C.	90.26	8.79	.95	89.8

7880	do	do	W. M. Neal & Co., Mooresville, N. C.	*63.27	24.12	12.61	77.0
7840	do	do	Wilkins, Ricks & Co., Sanford, N. C.	92.28	6.56	1.16	82.8
7749	do	do	Farmers' Union Warehouse Co., Morgantown, N. C.	*86.23	13.29	18	89.5
7407	do	do	T. P. Nash, Elizabeth City, N. C.	*58.67	19.47	11.86	84.8
7452	do	do	West Jefferson Supply Co., West Jefferson, N. C.	*51.66	34.76	13.38	84.5
7806	do	do	W. H. McClure, Hazelwood, N. C.	90.03	9.08	8.0	81.1
7551	do	do	Sylvia Supply Co., Sylva, N. C.	90.40	7.20	2.40	88.3
7483	do	do	F. R. Ashcraft, Monroe, N. C.	91.98	6.73	1.29	85.0
7748	do	do	J. D. Blanton, Marion, N. C.	90.50	6.07	1.33	81.5
7546	do	do	Carolina Warehouse Co., Greensboro, N. C.	93.03	5.60	1.37	95.0
7804	do	do	W. B. Fisher, Andrews, N. C.	95.19	3.79	1.02	79.3
7482	do	do	Gaston Seed and Provision Co., Gastonia, N. C.	*89.22	8.33	2.45	86.3
7747	do	do	Lineberger Seed Co., Gastonia, N. C.	91.99	5.57	2.11	72.3
7878	do	do	Miller Grocery Co., North Wilkesboro, N. C.	91.67	4.18	8.0	71.5
7545	do	do	S. L. Owen, Lexington, N. C.	91.27	6.87	1.86	94.5
7553	do	do	Harrison & Co., Lenoir, N. C.	*75.40	8.65	16.25	89.3
7879	do	do	do	*76.72	8.11	15.17	88.8
7807	do	do	L. R. Stricker, Asheville, N. C.	93.09	5.53	1.18	87.5
7422	Rye	(cheat, wild garlie.)	Adams Grain and Provision Co., Norfolk, Va.	*91.46	5.21	3.63	90.0
7413	do	do	M. J. Best & Sons, Goldsboro, N. C.	98.79	1.21		75.0
7417	do	do	Hobbs & Ross, Warsaw, N. C.	98.67	1.20	.13	186.0
7424	do	do	J. R. Smith & Co., Ayden, N. C.	98.72	1.11	.17	166.5
7418	do	do	H. C. Joyner, Rocky Mount, N. C.	*92.93	2.79	1.28	479.5

TABLE XII—RESULTS OF TESTS OF 26 KINDS OF AGRICULTURAL SEEDS, 576 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 1, 1915, TO JULY 1, 1916—Continued.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pure Seed	Per Cent of Inert Matter	Per Cent of Foreign Seed	Per Cent of Germination
7497	Rye, <i>(Chaut.)</i>	Hickory Seed Co., Hickory, N. C.	J. D. Howe, Wadesboro, N. C.	98.29	1.14	.57	73.5
7412	do	do	J. C. Peterson, Clinton, N. C.	92.33	.98	6.69	43.0
7415	do	Wm. G. Scarlett & Co., Baltimore, Md.	T. P. Nash, Elizabeth City, N. C.	92.30	6.13	1.27	42.5
7496	do	T. W. Wood & Sons, Richmond, Va.	F. B. Ashcraft, Monroe, N. C.	95.88	1.22	3.20	46.5
7463	do	do	Harris & McNeely, Mooresville, N. C.	96.82	1.24	1.91	51.0
7416	do	do	Ashley Horne & Sons, Clayton, N. C.	98.41	1.00	.56	49.5
7419	do	do	J. B. Johnston, Greenville, N. C.	98.61	.87	.52	40.0
7421	do	do	W. D. Kelly, Clinton, N. C.	98.19	.50	1.11	46.0
7642	do	do	Parrish-Goodwin Co., Benson, N. C.	96.11	2.65	1.81	41.5
7120	do	do	B. F. Powell, Clinton, N. C.	98.26	.32	1.42	41.0
7414	do	do	Spence & Hollowell, Elizabeth City, N. C.	98.21	1.15	.31	74.5
7700	do	do	J. P. Walters, LaGrange, N. C.	96.83	1.85	1.32	44.0
7423	do	North Carolina Rye	D. L. Gore Co., Wilmington, N. C.	96.79	2.63	.58	45.5
7452	do	Dealer not given	L. R. Stricker, Asheville, N. C.	98.06	1.91	...	91.0
7834	Timothy	S. T. Beveridge & Co., Richmond, Va.	J. H. Ditmore, Bryson City, N. C.	97.98	1.23	.79	43.8
7827	do	J. Polignano & Son, Baltimore, Md.	W. J. Gudger & Sons, Marshall, N. C.	96.11	2.51	1.32	42.3
7404	do	J. J. Buffington & Co., Baltimore, Md.	W. S. White & Co., Elizabeth City, N. C.	97.63	1.09	1.28	43.0
7336	do	Carter, Venable & Co., Richmond, Va.	J. O. Houston & Son, Hendersonville, N. C.	98.82	.51	.64	47.5
7535	do	Diggs & Beadles, Richmond, Va.	W. P. Ware, Reidsville, N. C.	99.67	.24	.09	47.8

7826	do.	Hackney, Broyles & Lackey, Knoxville, Tenn.	R. N. Ramsey, Marshall, N. C.	96.32	2.01	1.57	181.0
7442	do.	Hamilton, Bacon & Hamilton, Bristol, Tenn.	W. S. Miller & Co., Todd, N. C.	95.67	.81	.52	172.5
7830	do.	Hardin, Hamilton & Lewman, Louisville, Ky.	John E. Fain, Murphy, N. C.	98.58	.83	.59	96.0
7832	do.	do.	Hunter's Pharmacy, Hendersonville, N. C.	96.52	2.01	1.14	167.8
7582	do.	do.	Scott Seed Co., Greensboro, N. C.	98.58	.78	.61	93.0
7492	do.	Kirby Seed Co., Gaffney, S. C.	Lincoln Farmers' Union Warehouse Co., Lincolnton, N. C.	98.08	1.26	.65	178.5
7829	do.	D. Landreth Seed Co., Bristol, Pa.	Grant's Pharmacy, Asheville, N. C.	99.38	.52	.40	87.5
7831	do.	Louisville Seed Co., Louisville, Ky.	R. H. Hyatt & Co., Murphy, N. C.	99.25	.56	.49	88.3
7731	do.	do.	L. A. Kincaid, Morganton, N. C.	98.17	1.08	.75	95.8
7835	do.	National Seed Co., Louisville, Ky.	D. K. Collins, Bryson City, N. C.	99.48	.33	.19	89.3
7534	do.	Roanoke Seed and Supply Co., Roanoke, Va.	Farmers' Union Agency Co., Winston-Salem, N. C.	98.82	.81	.31	160.3
7611	do.	do.	J. F. Fulton, Greensboro, N. C.	98.51	.91	.58	96.5
7883	do.	N. R. Savage & Son, Richmond, Va.	C. Call, North Wilkesboro, N. C.	98.58	.76	.66	90.8
7536	do.	do.	Farmers' Cash Seed and Feed Co., Winston-Salem, N. C.	97.38	1.09	1.53	150.5
7884	do.	do.	W. E. Merritt & Co., Mount Airy, N. C.	96.82	1.28	1.90	91.5
7443	do.	Wm. G. Scarlett & Co., Baltimore, Md.	M. B. Blackburn, Boone, N. C.	99.03	.88	.69	135.8
7735	do.	do.	Farmers' Union Warehouse Co., Morganton, N. C.	99.25	.61	.44	152.3
7335	do.	do.	W. T. Sharp, Canton, N. C.	99.98	.01	.01	150.5
7581	do.	do.	Spence & Hollowell, Elizabeth City, N. C.	99.12	.18	.10	124.5
7825	do.	L. R. Stricker, Asheville, N. C.	Sylvan Supply Co., Sylva, N. C.	96.78	1.66	1.56	92.3
7885	do.	T. W. Wood & Sons, Richmond, Va.	J. B. Barnes, Taylorsville, N. C.	99.17	.14	.39	89.5
7776	do.	do.	J. D. Blanton, Marion, N. C.	98.72	.51	.71	177.8

TABLE VII. RESULTS OF TESTS OF 26 KINDS OF AGRICULTURAL SEEDS, 576 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 1, 1915, TO JULY 1, 1916—Continued.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pure Seed	Per Cent of Inert Matter	Per Cent of Foreign Seed	Per Cent of Germination
7538	Timothy	T. W. Wood & Sons, Richmond, Va.	Brevard Hardware Co., Brevard, N. C.	99.92	.91	.01	165.3
7539	do	do	Carolina Warehouse Co., Greensboro, N. C.	99.23	.29	.48	172.3
7524	do	do	W. B. Fisher, Andrews, N. C.	98.89	.53	.58	88.5
7195	do	do	Gaston Seed and Provision Co., Gastonia, N. C.	98.54	.63	.73	176.8
7533	do	do	Houston & Son, Hendersonville, N. C.	98.13	1.03	.81	86.5
7537	do	do	Lincoln Farmers' Union Warehouse Co., Lincoln, N. C.	99.02	.39	.59	90.0
7441	do	do	W. R. McNeill, Laurel Springs, N. C.	99.96	.01	.03	172.3
7531	do	do	S. L. Owen, Lexington, N. C.	97.87	.87	1.26	160.0
7533	do	do	Perry Grocery Co., Lexington, N. C.	97.53	1.40	1.97	171.8
7535	do	do	Sherrill & Reese, Statesville, N. C.	99.19	.38	.43	111.8
7532	do	do	J. T. Turner, Asheville, N. C.	98.88	.44	.68	175.0
7582	do	Wood, Stubbs & Co., Louisville, Ky.	Harrison & Co., Lenoir, N. C.	99.18	.72	.10	97.0
7337	do	Dealer not given	T. S. Morrison & Co., Asheville, N. C.	97.43	.77	1.80	166.0
7528	do	do	do	99.12	.39	.49	99.0
7539	do	do	L. R. Stricker, Asheville, N. C.	99.96	.02	.02	183.0
7550	VETCH, SPRING	Diggs & Beadles, Richmond, Va.	Carolina Warehouse Co., Greensboro, N. C.	98.38	.68	.91	92.5
7645	do	do	A. S. Husko, Fayetteville, N. C.	98.73	.27	1.00	97.0
7664	VETCH, WINTER (Corn cockle)	Adams Grain and Provision Co., Charlotte, N. C.	W. H. Allen, Greenville, N. C.	98.24	.96	1.70	21.5

7408	do.	I. L. Radwaner, New York, N. Y.	W. J. Kirkham, Wilmington, N. C.	.00	1.48	98.52	50.0
7411	do.	T. W. Wood & Sons, Richmond, Va.	J. E. Hood & Co., Kingston, N. C.	98.30	.22	1.48	91.5
7409	(<i>Corn cockle</i> .)	do.	J. B. Johnston, Greenville, N. C.	98.51	.25	1.21	77.5
7549	(<i>Corn cockle</i> .)	do.	Randolph Supply Co., Asheville, N. C.	99.45	.22	.33	79.5
7547	do.	do.	J. T. Turner, Asheville, N. C.	98.60	1.24	.16	58.5
7410	(<i>Corn cockle</i> .)	do.	Winslow & Allen, Greenville, N. C.	98.16	.12	1.12	57.0
7548	(<i>Corn cockle</i> .)	Wood, Stubbs & Co., Louisville, Ky.	W. P. Ware, Asheville, N. C.	98.21	.17	1.32	40.5
7549	do.	Dealer not given.	L. R. Stricker, Asheville, N. C.	94.72	.54	1.74	3.0
	(<i>Corn cockle</i> .)						

*Below standard for purity.

†Below standard for germination.

[illegible]

TABLE XIV.—THE ADULTERATION OF AGRICULTURAL SEEDS.

Lot Number	Kind of Seed	Wholesale Dealer	Retail Dealer	Adulterant	Per Cent of Adulteration
7665	ALFALFA	Carter, Venable & Co., Richmond, Va.	W. H. Allen, Greenville, N. C.	Crimson Clover	12
7408	HARDY VETCH	I. L. Radwanet, New York, N. Y.	W. J. Kirkham, Wilmington, N. C.	Spring Vetch	98
7343	Orchard Grass	L. R. Stricker, Asheville, N. C.	Sylvia Supply Co., Sylva, N. C.	Perennial Rye Grass	15
7403	Redtop	Wm. G. Scarlett & Co., Baltimore, Md.	T. P. Nash, Elizabeth City, N. C.	Timothy	7
7452	do	do	West Jefferson Supply Co., West Jefferson, N. C.	do	8
7453	do	Wood, Stubbs & Co., Louisville, Ky.	Harrison & Co., Lenoir, N. C.	do	12
7512	do	Diggs & Bradles, Richmond, Va.	W. P. Ware, Roidsville, N. C.	do	8
7512	do	Louisville Seed Co., Louisville, Ky.	Houston & Son, Hendersonville, N. C.	do	8
7579	do	Wood, Stubbs & Co., Louisville, Ky.	Harrison & Co., Lenoir, N. C.	do	11
7568	TALL OAT GRASS	Roanoke Seed and Supply Co., Roanoke, Va.	S. L. Owen, Lexington, N. C.	Orchard Grass	7
7552	do	Dealer not given	L. R. Stricker, Asheville, N. C.	Rye Grasses	30

NOTE.—The above table shows 11 cases of adulteration which were found in the 575 agricultural seed samples collected by inspectors. No case is reported where an adulterant was not present to the amount of five (5) per cent.

TABLE XV.—RESULTS OF GERMINATION TESTS OF 28 KINDS OF VEGETABLE SEEDS, 355 SAMPLES IN ALL, COLLECTED BY INSPECTORS
FROM JULY 1, 1915, TO JULY 1, 1916.

Laboratory Number	Kind of Seed	Wholesale Dealer	Retail Dealer	Per Cent of Germination
4774	BEANS	Robert Buist Co., Philadelphia, Pa.	R. E. La Cook, Tallahassee, N. C.	90.0
4777	do.	do.	do.	94.0
4780	do.	do.	H. E. Kendall, Shelby, N. C.	96.0
4835	do.	do.	Dunn's Standard Drug Store, Kingston, N. C.	99.0
4873	do.	do.	F. W. Parker Drug Co., Raleigh, N. C.	100.0
4916	do.	do.	Dorsey Drug Co., Henderson, N. C.	100.0
4917	do.	do.	do.	94.0
4918	do.	do.	do.	98.0
4919	do.	do.	do.	47.5
4831	do.	W. W. Barnard Co., Chicago, Ill.	W. P. Kornegay, Mount Olive, N. C.	98.0
4735	do.	Everett B. Clarke Seed Co., Milford, Conn.	A. S. Huske, Fayetteville, N. C.	92.0
4736	do.	do.	do.	99.0
4931	do.	Crosman Bros. Co., Rochester, N. Y.	Nash Supply Co., Nashville, N. C.	94.0
4922	do.	Diggs & Beadles, Richmond, Va.	J. W. Draymont, Rocky Mount, N. C.	98.0
4775	do.	D. M. Ferry & Co., Detroit, Mich.	W. W. Parker, Henderson, N. C.	86.0
4984	do.	do.	W. G. Cole, Canton, N. C.	99.0
4985	do.	do.	do.	86.0
4850	do.	Griffith & Turner Co., Baltimore, Md.	Red Springs Drug Co., Red Springs, N. C.	100.0
4849	do.	do.	do.	96.0

TABLE XV. RESULTS OF GERMINATION TESTS OF 28 KINDS OF VEGETABLE SEEDS, 355 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 1, 1915, TO JULY 1, 1916—Continued.

Laboratory Number	Kind of Seed	Wholesale Dealer	Retail Dealer	Pct Cent of Germination
4818	Beans	Griffith & Turner Co., Baltimore, Md.	Rel Springs Drug Co., Red Springs, N. C.	90.0
4206	do	Lake Shore Seed Co., Dunkirk, N. Y.	Harrison & Co., Lenoir, N. C.	32.0
4738	do	D. Landreth Seed Co., Bristol, Pa.	J. H. Rudisill & Co., Lenoir, N. C.	92.0
4739	do	do	do	92.0
4740	do	do	Lincoln Drug Co., Lenoir, N. C.	98.0
4874	do	do	T. C. Morgan & Co., Morganton, N. C.	83.0
4986	do	do	McAfee-Brodie Drug Co., Brevard, N. C.	88.0
4987	do	do	do	83.0
4988	do	do	Brevard Hardware Co., Brevard, N. C.	96.0
4990	do	do	do	88.0
4991	do	do	do	97.0
4989	do	do	do	90.0
4981	do	do	Grant's Pharmacy, Asheville, N. C.	78.0
4983	do	do	do	90.0
4927	do	Leonard Seed Co., Chicago, Ill.	Ruffin-High Co., Wilson, N. C.	96.0
4878	do	do	do	72.0
4836	do	do	J. E. Hood & Co., Kinston, N. C.	100.0
4737	do	do	Simpson's Drug Store, Monroe, N. C.	98.0
4678	do	do	W. J. Kirkham & Co., Wilmington, N. C.	92.0

4839	do.	do.	Charles L. Johnson, Warsaw, N. C.	85.0
4841	do.	do.	do.	99.0
4840	do.	do.	do.	91.0
4928	do.	do.	J. G. Hall, Oxford, N. C.	98.0
4929	do.	do.	do.	92.0
4930	do.	do.	do.	86.0
4975	do.	do.	Hunter's Pharmacy, Hendersonville, N. C.	95.0
4976	do.	do.	do.	92.0
4977	do.	do.	do.	98.0
4875	do.	Louisville Seed Co., Louisville, Ky.	F. A. Kincaid, Morganton, N. C.	91.0
4813	do.	J. B. Rice Seed Co., Cambridge, N. Y.	E. F. Faison, Faison, N. C.	96.0
4844	do.	do.	do.	100.0
4734	do.	do.	A. S. Huske, Fayetteville, N. C.	92.0
4832	do.	do.	W. R. Harrell, Burgaw, N. C.	83.0
4818	do.	do.	S. J. Adams, Raleigh, N. C.	78.0
4820	do.	do.	M. W. Pope, Mount Olive, N. C.	91.0
4676	do.	do.	W. S. White & Co., Elizabeth City, N. C.	92.0
4926	do.	Slate Seed Co., South Boston, Va.	J. D. Williams, Wilson, N. C.	91.0
4924	do.	do.	do.	94.0
4923	do.	do.	do.	91.0
4925	do.	do.	do.	96.0
4731	do.	do.	Ruggin's Feed and Seed Co., Winston-Salem, N. C.	86.0
4732	do.	do.	do.	98.0
4733	do.	do.	Farmers' Union Agency, Winston-Salem, N. C.	94.0
4855	do.	T. W. Wood & Sons, Richmond, Va.	J. W. Carter, Maxton, N. C.	100.0
4853	do.	do.	do.	94.0

TABLE VA. RESULTS OF GERMINATION TESTS OF 28 KINDS OF VEGETABLE SEEDS, 365 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 1, 1915, TO JULY 1, 1916. (Continued.)

Laboratory Number	Kind of Seed	Wholesale Dealer	Retail Dealer	Per Cent of Germination
4554	Beans	T. W. Wood & Sons, Richmond, Va.	J. W. Carter, Maxton, N. C.	98.0
4724	do	do	W. N. Jeans, Wadesboro, N. C.	96.0
4817	do	do	Powell & Co., Vineland, N. C.	100.0
4675	do	do	W. H. Horne & Sons, Jacksonville, N. C.	85.0
4776	do	do	Lenoir Drug Co., Kinston, N. C.	86.0
4838	do	do	P. O. Leggett, Southport, N. C.	90.0
4837	do	do	do	62.0
4815	do	Wood, Stubbs & Co., Louisville, Ky.	Vineland Dry Goods Co., Vineland, N. C.	75.5
4846	do	do	do	100.0
4725	do	do	W. N. Jeans, Wadesboro, N. C.	90.0
4851	do	do	Pace Grocery Co., Maxton, N. C.	96.0
4852	do	do	do	98.0
4727	do	do	R. L. Leonard, Lexington, N. C.	96.0
4728	do	do	do	90.0
4877	do	do	Lineberger Seed Co., Gastonia, N. C.	61.0
4833	do	do	McLaurin & Shaw, Lenoirburg, N. C.	72.0
4834	do	do	do	98.0
4726	do	do	W. D. Holland, Dunn, N. C.	100.0
4723	do	do	do	81.0

4729	do	do	J. E. Webb, Shelby, N. C.	98.0
4677	do	do	Paul Webb, Shelby, N. C.	92.0
4920	do	do	H. C. Joyner, Rocky Mount, N. C.	87.0
4924	do	do	do	98.0
4812	do	do	Brown Mercantile Co., Chadbourne, N. C.	100.0
12063	do	do	Harrison & Co., Lenoir, N. C.	98.0
4674	do	Dealer not given	W. J. Kirkham & Co., Wilmington, N. C.	11.0
4980	do	do	L. R. Stricker, Asheville, N. C.	98.0
4979	do	do	do	96.0
4978	do	do	do	26.9
4754	BUTS	American Seed Co., Detroit, Mich.	Paul Webb, Shelby, N. C.	66.5
4814	do	do	Ruffin-High Co., Wilson, N. C.	75.5
4958	do	do	J. D. Winstead, Nashville, N. C.	78.5
4806	do	Robert Buist Co., Philadelphia, Pa.	F. W. Parker Drug Co., Raleigh, N. C.	73.5
4701	do	do	R. R. Bellamy, Wilmington, N. C.	71.0
4762	do	do	do	68.5
4804	do	do	R. E. L. Cook, Tarboro, N. C.	61.0
4762	do	Crosman Bros. Co., Rochester, N. Y.	A. O. Free, Asheville, N. C.	70.5
4942	do	do	Ruffin-High Co., Wilson, N. C.	70.0
4961	do	do	R. J. Shields, Holgood, N. C.	22.0
12021	do	do	Miller Grocery Co., North Wilkesboro, N. C.	38.0
4690	do	D. M. Ferry & Co., Detroit, Mich.	T. N. Waters & Bros., Goldsboro, N. C.	70.0
4871	do	do	R. D. Usher, Rose Hill, N. C.	81.5
4950	do	do	W. S. Bazemore, Lewiston, N. C.	88.5
4998	do	do	John L. Jackson Co., Tryon, N. C.	81.5
4764	do	Lake Shore Seed Co., Dunkirk, N. Y.	Lincoln Drug Co., Lenoir, N. C.	81.5

TABLE IV RESULTS OF GERMINATION TESTS OF 28 KINDS OF VEGETABLE SEEDS, 365 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 1, 1915, TO JULY 1, 1916—CONTINUED.

Inventory Number	Kind of Seed	Wholesale Dealer	Retail Dealer		Per Cent of Germination
12018	BEETS	Lake Shore Seed Co., Dunkirk, N. Y.	Harrison & Co., Lenoir, N. C.		82.5
1945	do	D. Landreth Seed Co., Bristol, Pa.	T. H. Nicholson, Murfreesboro, N. C.		69.5
1974	do	J. B. Rice Seed Co., Cambridge, N. Y.	Hunter's Pharmacy, Hendersonville, N. C.		90.5
4750	do	do	A. S. Huske, Fayetteville, N. C.		71.0
4751	do	do	do		88.0
4880	do	do	W. A. Leslie, Morganton, N. C.		70.0
4979	do	T. W. Wood & Sons, Richmond, Va.	W. H. Horne & Sons, Jacksonville, N. C.		82.0
4885	do	do	Lineberger Seed Co., Gastonia, N. C.		88.0
12002	do	do	L. T. Sharp, Granite Falls, N. C.		87.0
4-03	do	Wood, Stubbs & Co., Louisville, Ky.	L. A. Kincaid, Morganton, N. C.		83.5
4767	do	Dealer not given	Scott Seed Co., Greensboro, N. C.		86.0
4980	do	do	W. J. Kirkham & Co., Wilmington, N. C.		89.0
4706	do	do	do		80.0
4788	BLACK-EYED PEAS	T. W. Wood & Sons, Richmond, Va.	E. B. Marston Drug Co., Kinston, N. C.		47.0
4014	CABBAGE	American Seed Co., Detroit, Mich.	W. C. Asbury, Lincolnton, N. C.		61.5
4939	do	do	J. D. Winstead, Nashville, N. C.		50.0
4998	do	Robert Buist Co., Philadelphia, Pa.	R. R. Bellamy, Wilmington, N. C.		66.0
4999	do	do	do		80.5
4802	do	do	R. E. L. Cook, Tarboro, N. C.		83.0

4803	do	do	do	75.5
4941	do	Crosman Bros. Co., Rochester, N. Y.	Ruffin-High Co., Wilson, N. C.	92.5
4964	do	do	R. J. Shields, Hologood, N. C.	9.5
4994	do	do	R. H. Hyatt & Co., Murphy, N. C.	38.0
4992	do	D. M. Ferry & Co., Detroit, Mich.	T. N. Waters & Bro., Goldsboro, N. C.	64.5
4951	do	do	W. S. Bazemore, Lewiston, N. C.	86.5
4997	do	do	John L. Jackson Co., Tryon, N. C.	81.5
4759	do	Lake Shore Seed Co., Dunkirk, N. Y.	Lincoln Drug Co., Lincolnton, N. C.	81.5
4801	do	do	Linberger Seed Co., Gastonia, N. C.	51.0
4959	do	do	Cummings' Grocery Co., Tarboro, N. C.	53.5
4909	do	D. Landreth Seed Co., Bristol, Pa.	Freeze Drug Co., Newton, N. C.	80.0
4946	do	do	T. H. Nicholson, Murfreesboro, N. C.	92.0
4808	do	J. B. Rice Seed Co., Cambridge, N. Y.	W. W. Parker, Henderson, N. C.	83.0
4806	do	do	do	89.5
4807	do	do	do	73.0
4809	do	do	do	94.0
4810	do	do	do	97.0
4826	do	do	S. J. Adams, Raleigh, N. C.	86.5
4934	do	T. W. Wood & Sons, Richmond, Va.	Watson's Pharmacy, Southport, N. C.	70.5
4798	do	do	Lenoir Drug Co., Kinston, N. C.	91.0
4200	do	do	J. W. Setzer, Claremont, N. C.	87.0
4901	do	Wood, Stubbs & Co., Louisville, Ky.	L. A. Kinead, Morganton, N. C.	62.5
4763	do	Dealer not given	W. J. Kirkham & Co., Wilmington, N. C.	91.5
4764	do	do	do	85.0
4821	do	do	F. W. Woodworth, Raleigh, N. C.	51.0
4684	CANTARON PE.	Robert Brist Co., Philadelphia, Pa.	R. R. Bellamy, Wilmington, N. C.	91.5

TABLE XV. RESULTS OF GERMINATION TESTS OF 28 KINDS OF VEGETABLE SEEDS, 365 SAMPLES IN ALL, COLLECTED BY INSPECTOR FROM JULY 15, 1915, TO JULY 15, 1916—CONTINUED.

Sub- number	Kind of Seed	Wholesale Dealer	Retail Dealer	Per Cent of Germination
4712	CANTALOUPE	Robert Buist Co., Philadelphia, Pa.	W. J. Kirkham & Co., Wilmington, N. C.	94.0
4720	do.	do.	A. S. Spencer, New Bern, N. C.	96.0
4721	do.	do.	do.	98.0
4715	do.	Diggs & Beaulieu, Richmond, Va.	E. P. Carter & Co., Washington, N. C.	84.0
4689	do.	D. M. Ferry & Co., Detroit, Mich.	T. N. Waters & Bro., Goldsboro, N. C.	90.5
4685	do.	do.	do.	74.5
4786	do.	Leonard Seed Co., Chicago, Ill.	Temple Drug Co., Kinston, N. C.	mis- laid
4817	do.	J. B. Rice Seed Co., Cambridge, N. Y.	S. J. Adams, Raleigh, N. C.	78.0
4889	do.	T. W. Wood & Sons, Richmond, Va.	Linsberger Seed Co., Gastonia, N. C.	95.0
4867	do.	Wood, Stubbs & Co., Louisville, Ky.	Pace Grocery Co., Maxton, N. C.	87.5
4868	do.	do.	McLaurin & Shaw, Laurinburg, N. C.	95.5
4905	do.	do.	L. A. Kincaid, Morganton, N. C.	87.0
4829	CARROT	J. B. Rice Seed Co., Cambridge, N. Y.	S. J. Adams, Raleigh, N. C.	63.0
12023	CARLIFFLOWER	Grosman Bros. Co., Rochester, N. Y.	Miller Grocery Co., North Wilkesboro, N. C.	48.0
12014	do.	do.	Harrison & Co., Lenoir, N. C.	31.5
4913	COLLARDS	American Seed Co., Detroit, Mich.	W. C. Ashbury, Lincolnton, N. C.	72.5
4700	do.	Robert Buist Co., Philadelphia, Pa.	R. R. Bellamy, Wilmington, N. C.	97.0
4887	CORN, SWEET	D. Landreth Seed Co., Bristol, Pa.	Freeze Drug Co., Newton, N. C.	96.0
4683	do.	J. B. Rice Seed Co., Cambridge, N. Y.	W. S. White & Co., Elizabeth City, N. C.	87.0

4672	CUCUMBER.....	W. W. Barnard Co., Chicago, Ill.....	T. N. Waters & Bro., Goldsboro, N. C.....	94.5
4805	do.....	Robert Buist Co., Philadelphia, Pa.....	R. E. L. Cook, Tarboro, N. C.....	80.5
4673	do.....	Everett B. Clarke Seed Co., Milford, Conn.....	R. R. Bellamy, Wilmington, N. C.....	85.5
4716	do.....	Diggs & Bradles, Richmond, Va.....	E. P. Carter & Co., Washington, N. C.....	97.5
4691	do.....	D. M. Ferry & Co., Detroit, Mich.....	T. N. Waters & Bro., Goldsboro, N. C.....	79.0
4796	do.....	T. W. Wood & Sons, Richmond, Va.....	Lenoir Drug Co., Kinston, N. C.....	99.5
4789	do.....	do.....	W. H. Allen, Greenville, N. C.....	97.5
4904	do.....	Wood, Stubbs & Co., Louisville, Ky.....	L. A. Kincaid, Morganton, N. C.....	11.5
4823	do.....	Dealer not given.....	F. W. Woodworth Co., Raleigh, N. C.....	21.5
4815	Egg-PLANT.....	American Seed Co., Detroit, Mich.....	Ruffin-High Co., Wilson, N. C.....	26.5
12022	do.....	Crosman Bros. Co., Rochester, N. Y.....	Miller Grocery Co., North Wilkesboro, N. C.....	18.0
4894	KALE.....	Lake Shore Seed Co., Dunkirk, N. Y.....	Linberger Seed Co., Gastonia, N. C.....	41.0
4900	LEEK.....	do.....	W. L. Kluttz, Salisbury, N. C.....	10.0
1895	do.....	do.....	Linberger Seed Co., Gastonia, N. C.....	26.0
4955	LETTUCE.....	American Seed Co., Detroit, Mich.....	George A. Barnes, Elm City, N. C.....	68.0
1757	do.....	do.....	Paul Webb, Shelby, N. C.....	98.0
4993	do.....	Crosman Bros. Co., Rochester, N. Y.....	R. H. Hyatt & Co., Murphy, N. C.....	16.0
4913	do.....	do.....	Ruffin-High Co., Wilson, N. C.....	31.0
1764	do.....	do.....	A. O. Free, Asheboro, N. C.....	51.5
4872	do.....	D. M. Ferry & Co., Detroit, Mich.....	R. D. Usher, Rose Hill, N. C.....	58.0
4960	do.....	Lake Shore Seed Co., Dunkirk, N. Y.....	Gunning's Grocery Co., Tarboro, N. C.....	37.5
4948	do.....	D. Landreth Seed Co., Bristol, Pa.....	T. H. Nicholson, Murfreesboro, N. C.....	50.0
4906	do.....	do.....	Freeze Drug Co., Newton, N. C.....	48.5
4682	do.....	Leonard Seed Co., Chicago, Ill.....	W. J. Kirkham & Co., Wilmington, N. C.....	93.0
4825	do.....	J. B. Rice Seed Co., Cambridge, N. Y.....	S. J. Adams, Raleigh, N. C.....	92.0
4791	do.....	T. W. Wood & Sons, Richmond, Va.....	W. H. Allen, Greenville, N. C.....	81.5

TABLE XV.—RESULTS OF GERMINATION TESTS OF 28 KINDS OF VEGETABLE SEEDS, 365 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 1, 1915, TO JULY 1, 1916—CONTINUED.

Laboratory Number	Kind of Seed	Wholesale Dealer	Retail Dealer	Per Cent of Germination
4768	LETTUCE	Dealer not given.	Scott Seed Co., Greensboro, N. C.	93.5
4741	LIMA BEANS	Piggs & Beadles, Richmond, Va.	Smith Grocery Co., Lexington, N. C.	85.0
4778	do.	Leonard Seed Co., Chicago, Ill.	W. W. Parker, Henderson, N. C.	96.0
4779	do.	do.	Temple Drug Co., Kinston, N. C.	81.0
4780	do.	do.	Ruffin-Hugh Co., Wilson, N. C.	92.0
4962	MUSKWELOS	Crosman Bros. Co., Rochester, N. Y.	R. J. Shields, Hobgood, N. C.	92.5
4898	do.	Lake Shore Seed Co., Dunkirk, N. Y.	W. L. Klutts, Salisbury, N. C.	84.5
4793	do.	T. W. Wood & Sons, Richmond, Va.	W. H. Allen, Greenville, N. C.	82.5
4770	MUSTARD	American Seed Co., Detroit, Mich.	M. A. Gilmore & Co., Wadesboro, N. C.	72.5
4954	do.	do.	George A. Barnes, Elm City, N. C.	67.0
4719	do.	Robert Buist Co., Philadelphia, Pa.	A. S. Spencer, New Bern, N. C.	93.5
4892	do.	Lake Shore Seed Co., Dunkirk, N. Y.	Lindeberger Seed Co., Gastonia, N. C.	65.5
4899	do.	do.	W. L. Klutts, Salisbury, N. C.	73.5
4890	do.	T. W. Wood & Sons, Richmond, Va.	Lindeberger Seed Co., Gastonia, N. C.	96.0
4792	do.	do.	W. H. Allen, Greenville, N. C.	91.0
4697	do.	do.	Watson's Pharmacy, Southport, N. C.	85.5
12007	do.	do.	J. W. Setzer, Clarendon, N. C.	95.0
4769	do.	Dealer not given.	Scott Seed Co., Greensboro, N. C.	89.0
4705	do.	do.	W. J. Kirkham & Co., Wilmington, N. C.	66.5

4812	ORRA	American Seed Co., Detroit, Mich.	Ruffin-High Co., Wilson, N. C.	52.0
4811	do.	do.	do.	52.0
4915	do.	do.	W. C. Asbury, Linedalen, N. C.	25.0
4819	do	Robert Buist Co., Philadelphia, Pa.	F. W. Parker Drug Co., Raleigh, N. C.	63.0
4801	do	do	R. E. L. Cook, Tarboro, N. C.	75.0
4768	do	do	W. J. Kirkham & Co., Wilmington, N. C.	70.0
4800	do.	T. W. Wood & Sons, Richmond, Va.	Lenoir Drug Co., Kinston, N. C.	63.0
4790	do	do.	W. H. Allen, Greenville, N. C.	41.0
4718	OSGON	Robert Buist Co., Philadelphia, Pa.	A. S. Spencer, New Bern, N. C.	61.0
12012	do.	Crosman Bros. Co., Rochester, N. Y.	Harrison & Co., Lenoir, N. C.	61.0
4824	do.	Dealer not given	F. W. Woolworth Co., Raleigh, N. C.	37.0
4717	PARSLY	Diggs & Beadles, Richmond, Va.	E. P. Carter & Co., Washington, N. C.	68.5
12013	PARSAP	Crosman Bros. Co., Rochester, N. Y.	Harrison & Co., Lenoir, N. C.	1.5
12020	do.	do.	Miller Grocery Co., North Wilkesboro, N. C.	0.0
4857	PEAS	W. W. Barnard Co., Chicago, Ill.	W. P. Kornegay, Mount Olive, N. C.	91.0
4603	do.	Robert Buist Co., Philadelphia, Pa.	Dorsey Drug Co., Henderson, N. C.	92.0
4746	do.	do.	Parsons Drug Co., Wadesboro, N. C.	95.0
4747	do.	do.	do.	82.5
4749	do.	do.	H. E. Kendall, Shelby, N. C.	82.0
4783	do.	do.	R. E. L. Cook, Tarboro, N. C.	76.0
4934	do.	Crosman Bros. Co., Rochester, N. Y.	Nash Supply Co., Nashville, N. C.	91.0
12017	do.	Lake Shore Seed Co., Dunkirk, N. Y.	Harrison & Co., Lenoir, N. C.	84.0
4973	do.	D. Landreth Seed Co., Bristol, Pa.	Brevard Hardware Co., Brevard, N. C.	91.0
4965	do.	do.	Grant's Pharmacy, Asheville, N. C.	91.0
4971	do	do.	do.	77.5
4970	do	do.	do.	81.0

TABLE XV RESULTS OF GERMINATION TESTS OF 28 KINDS OF VEGETABLE SEEDS, 365 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 1, 1915, TO JULY 1, 1916 CONTINUED.

Inventory Number	Kind of Seed	Wholesale Dealer	Retail Dealer	Per Cent of Germination
4558	PEAS	D. Landreth Seed Co., Bristol, Pa.	Dunn's Standard Drug Store, Kinston, N. C.	98.0
4743	do.	do.	Carolina Warehouse, Greensboro, N. C.	70.0
4744	do.	do.	do.	62.0
4972	do.	Leonard Seed Co., Chicago, Ill.	Hunter's Pharmacy, Hendersonville, N. C.	65.0
4966	do.	do.	do.	93.0
4936	do.	do.	J. G. Hall, Oxford, N. C.	75.0
4935	do.	do.	do.	94.0
4781	do.	do.	Ruffin-High Co., Wilson, N. C.	87.0
4856	do.	do.	J. E. Hood & Co., Kinston, N. C.	90.0
4782	do.	do.	W. W. Parker, Henderson, N. C.	100.0
4860	do.	do.	Charles L. Johnson, Warsaw, N. C.	80.0
4669	do.	do.	W. J. Kirkham & Co., Wilmington, N. C.	77.0
4742	do.	do.	Simpson's Drug Store, Monroe, N. C.	89.0
4862	do.	J. B. Rice Seed Co., Cambridge, N. Y.	J. C. Peterson, Clinton, N. C.	98.0
4746	do.	do.	A. S. Huske, Fayetteville, N. C.	66.0
4670	do.	do.	do.	87.0
4671	do.	do.	B. G. Thompson, Goldsboro, N. C.	97.0
4748	do.	Shate Seed Co., South Boston, Va.	Riggin's Feed and Seed Co., Winston-Salem, N. C.	100.0
4861	do.	T. W. Wood & Sons, Richmond, Va.	P. O. Leggett, Southport, N. C.	87.0

4863	do	Wood, Stables & Co., Louisville, Ky.	Brown Mercantile Co., Chadbourne, N. C.	98.0
4859	do	do	McLaurin & Shaw, Laurinburg, N. C.	96.0
4922	do	do	H. C. Joyner, Rocky Mount, N. C.	62.0
4967	do	Dealer not given	L. R. Stricker, Asheville, N. C.	88.0
4969	do	do	do	91.0
4968	do	do	do	79.0
4911	Paper	American Seed Co., Detroit, Mich.	W. C. Asbury, Lenoir, N. C.	49.5
4910	do	D. Landreth Seed Co., Bristol, Pa.	Freeze Drug Co., Newton, N. C.	47.0
4794	do	T. W. Wood & Sons, Richmond, Va.	W. H. Allen, Greenville, N. C.	72.5
4795	do	do	Lenoir Drug Co., Kinston, N. C.	82.0
4771	Raisin	American Seed Co., Detroit, Mich.	M. A. Gilmore & Co., Wadesboro, N. C.	93.0
4756	do	do	Paul Webb, Shelby, N. C.	68.0
4956	do	do	George A. Barnes, Elm City, N. C.	29.0
4937	do	do	J. D. Winstead, Nashville, N. C.	72.5
4813	do	do	Ruffin-High Co., Wilson, N. C.	67.0
4992	do	Crosman Bros. Co., Rochester, N. Y.	R. H. Hyatt & Co., Murphy, N. C.	89.5
12011	do	do	Harrison & Co., Lenoir, N. C.	91.5
12010	do	do	do	73.0
4765	do	do	A. O. Free, Ashboro, N. C.	36.5
4949	do	do	W. S. Bazemore, Lewiston, N. C.	97.0
4999	do	D. M. Ferry & Co., Detroit, Mich.	John L. Jackson Co., Tryon, N. C.	88.5
4869	do	do	R. D. Fisher, Rose Hill, N. C.	99.0
4897	do	Lake Shore Seed Co., Dunkirk, N. Y.	W. L. Klutz, Salisbury, N. C.	13.0
4957	do	do	Cummings' Grocery Co., Tarboro, N. C.	84.5
4760	do	do	Lincoln Drug Co., Lenoir, N. C.	80.5
4907	do	D. Landreth Seed Co., Bristol, Pa.	Freeze Drug Co., Newton, N. C.	82.0

TABLE XV.—RESULTS OF GERMINATION TESTS OF 28 KINDS OF VEGETABLE SEEDS, 365 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 1, 1915, TO JULY 1, 1916—(CONTINUED).

Sublot Number	Kind of Seed	Wholesale Dealer	Retail Dealer	Per Cent of Germination
4947	RADISH	D. Landreth Seed Co., Bristol, Pa.	T. H. Nicholson, Murfreesboro, N. C.	62.0
4956	do	T. W. Wood & Sons, Richmond, Va.	Watson's Pharmacy Co., Southport, N. C.	96.5
4766	do	Dealer not given	Scott Seed Co., Greensboro, N. C.	88.5
4953	RETBAGA	American Seed Co., Detroit, Mich.	George A. Barnes, Elm City, N. C.	92.0
4663	do	Robert Buist Co., Philadelphia, Pa.	J. F. Clarke, New Bern, N. C.	65.0
4664	do	do	T. P. Nash, Elizabeth City, N. C.	72.5
4661	do	Leonard Seed Co., Chicago, Ill.	W. J. Kirkham & Co., Wilmington, N. C.	73.0
4662	do	T. W. Wood & Sons, Richmond, Va.	J. C. Whitty & Co., New Bern, N. C.	89.5
4822	do	Dealer not given	F. W. Woolworth Co., Raleigh, N. C.	83.5
4722	SQUASH	Robert Buist Co., Philadelphia, Pa.	A. S. Spencer, New Bern, N. C.	85.0
4713	do	Diggs & Bradles, Richmond, Va.	E. P. Carter & Co., Washington, N. C.	74.0
12019	do	Lake Shore Seed Co., Dunkirk, N. Y.	Harrison & Co., Lenoir, N. C.	56.0
4651	do	J. B. Rice Seed Co., Cambridge, N. Y.	J. H. Hardin, Wilmington, N. C.	94.0
4653	do	T. W. Wood & Sons, Richmond, Va.	Watson's Pharmacy Co., Southport, N. C.	82.0
4799	do	do	Lenoir Drug Co., Kinston, N. C.	91.0
4820	do	Dealer not given	F. W. Woolworth Co., Raleigh, N. C.	90.0
4687	TOMATO	Robert Buist & Co., Philadelphia, Pa.	R. R. Bellamy, Wilmington, N. C.	92.5
4944	do	Crosman Bros. Co., Rochester, N. Y.	Ruffin-Hugh Co., Wilson, N. C.	88.5
4714	do	Diggs & Bradles, Richmond, Va.	E. P. Carter & Co., Washington, N. C.	73.5

4896	do	Lake Shore Seed Co., Dunkirk, N. Y.	W. L. Klutz, Salisbury, N. C.	81.5
12015	do	do	Harrison & Co., Lenoir, N. C.	88.0
4908	do	D. Landreth Seed Co., Bristol, Pa.	Freeze Drug Co., Newton, N. C.	87.0
4787	do	J. B. Rice Seed Co., Cambridge, N. Y.	W. W. Parker, Henderson, N. C.	91.5
4752	do	do	A. S. Huske, Fayetteville, N. C.	89.0
4753	do	do	do	94.0
4828	do	do	S. J. Adams, Raleigh, N. C.	93.5
4686	do	T. W. Wood & Sons, Richmond, Va.	W. H. Horne & Sons, Jacksonville, N. C.	93.5
12009	do	do	L. T. Sharp, Granite Falls, N. C.	97.5
12004	do	do	J. W. Setzer, Claremont, N. C.	87.0
12005	do	do	do	76.0
4797	do	do	Lenoir Drug Co., Kinston, N. C.	96.5
4695	do	do	Watson's Pharmacy Co., Southport, N. C.	80.0
4888	do	do	Lineberger Seed Co., Gastonia, N. C.	88.5
4902	do	Wood, Stubbs & Co., Louisville, Ky.	L. A. Kincaid, Morganton, N. C.	95.0
4755	Transvers	American Seed Co., Detroit, Mich.	Paul Webb, Shelby, N. C.	76.5
4773	do	do	M. A. Gilmore & Co., Wadesboro, N. C.	94.0
4772	do	do	do	72.0
4912	do	do	W. C. Asbury, Lenoirton, N. C.	79.5
4910	do	do	J. D. Winstead, Nashville, N. C.	89.0
4710	do	Robert Buist Co., Philadelphia, Pa.	W. J. Kirkham & Co., Wilmington, N. C.	77.0
4709	do	do	do	92.0
4763	do	Crosman Bros. Co., Rochester, N. Y.	A. O. Tree, Ashboro, N. C.	94.5
4963	do	do	R. J. Shields, Holgood, N. C.	23.0
4995	do	do	R. H. Hyatt & Co., Murphy, N. C.	62.0
4660	do	D. M. Ferry & Co., Detroit, Mich.	Davis Brothers, Columbia, N. C.	64.5

TABLE XV.—RESULTS OF GERMINATION TESTS OF 28 KINDS OF VEGETABLE SEEDS, 365 SAMPLES IN ALL, COLLECTED BY INSPECTORS
FROM JULY 1, 1915, TO JULY 1, 1916—Continued.

Sub- Number	Kind of Seed	Wholesale Dealer	Retail Dealer	Per Cent of Germination
4870	TURNIPS	D. M. Ferry & Co., Detroit, Mich.	R. D. Usher, Rose Hill, N. C.	84.5
4952	do	do	W. S. Bazemore, Lewiston, N. C.	89.0
4996	do	do	John L. Jackson Co., Tryon, N. C.	92.5
4558	do	Lake Shore Seed Co., Dunkirk, N. Y.	Lincoln Drug Co., Lincoln, N. C.	27.5
4893	do	do	Lindberger Seed Co., Gastonia, N. C.	83.5
4658	do	do	Cummings' Grocery Co., Tarboro, N. C.	39.0
4659	do	J. B. Rice Seed Co., Cambridge, N. Y.	T. N. Waters & Bro., Goldsboro, N. C.	64.0
4827	do	do	S. J. Adams, Raleigh, N. C.	100.0
42008	do	T. W. Wood & Sons, Richmond, Va.	J. W. Setzer, Claremont, N. C.	83.5
4707	do	Dealer not given	W. J. Kirkham & Co., Wilmington, N. C.	82.5
4711	WATERMELON	Robert Buist Co., Philadelphia, Pa.	do	68.0
4688	do	D. M. Ferry & Co., Detroit, Mich.	T. N. Waters & Bro., Goldsboro, N. C.	70.0
4668	do	do	do	77.0
4784	do	Leonard Seed Co., Chicago, Ill.	Temple Drug Co., Kinston, N. C.	63.0
4880	do	J. B. Rice Seed Co., Cambridge, N. Y.	W. A. Leslie, Morganton, N. C.	80.0
4667	do	do	J. H. Harden, Wilmington, N. C.	69.0
4785	do	do	W. W. Parker, Henderson, N. C.	93.0
4879	do	Slate Seed Co., South Boston, Va.	F. W. Parker Drug Co., Raleigh, N. C.	79.0
4881	do	do	do	68.0

4883	do.	do.	do.	68.0
4864	do.	do.	J. E. Hood & Co., Kingston, N. C.	61.0
4866	do.	do.	do.	65.0
4884	do.	T. W. Wood & Sons, Richmond, Va.	Linsberger Seed Co., Gastonia, N. C.	88.0
12000	do.	do.	L. T. Sharp, Granite Falls, N. C.	66.0
12001	do.	do.	do.	85.0
4665	do.	do.	W. H. Horne & Sons, Jacksonville, N. C.	71.0
4883	do.	Wood, Stubbs & Co., Louisville, Ky.	W. L. Klutz, Salisbury, N. C.	83.0
4865	do.	do.	Pace Grocery Co., Maxton, N. C.	79.0
4666	do.	Dealer not given	W. J. Kirkham & Co., Wilmington, N. C.	65.0

TABLE XVI.

SHOWING NUMBER AND AVERAGE PER CENT OF GERMINATION OF VEGETABLE SEED SAMPLES
TESTED, ACCORDING TO WHOLESALE DEALERS.

Wholesale Dealer	Number of Samples Tested	Average Per Cent of Germination
American Seed Co., Detroit, Mich.....	26	67.33
W. W. Barnard Co., Chicago, Ill.....	3	95.50
Robert Buist Co., Philadelphia, Pa.....	40	80.14
Everett B. Clarke Seed Co., Milford, Conn.....	3	92.17
Crosman Bros. Co., Rochester, N. Y.....	27	52.22
Diggs & Beadles, Richmond, Va.....	7	82.93
D. M. Ferry & Co., Detroit, Mich.....	23	82.22
Griffith & Turner Co., Baltimore, Md.....	3	95.33
Lake Shore Seed Co., Dunkirk, N. Y.....	23	60.41
D. Landreth Seed Co., Bristol, Pa.....	30	80.98
Leonard Seed Co., Chicago, Ill.....	31	74.29
Louisville Seed Co., Louisville, Ky.....	1	91.00
J. B. Rice Seed Co., Cambridge, N. Y.....	36	86.35
Slate Seed Co., South Boston, Va.....	13	84.39
Wood, Stubbs & Co., Louisville, Ky.....	30	86.00
T. W. Wood & Sons, Richmond, Va.....	46	84.94
Dealer not given.....	23	72.63

THE BULLETIN
OF THE
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE
RALEIGH

Vol. 37, No. 10

OCTOBER, 1916

Whole No. 225


- I. ANALYSES OF FERTILIZERS { FALL SEASON, 1915
SPRING SEASON, 1916
- II. ANALYSES OF COTTON-SEED MEAL

PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Postoffice at Raleigh, N. C., as second class matter.

February 7, 1901, under Act of June 6, 1900.

EDWARDS & BROUGHTON PRINTING CO.
STATE PRINTERS



ANALYSES OF FERTILIZERS

FALL SEASON, 1915; SPRING SEASON, 1916

BY B. W. KILGORE,

W. G. HAYWOOD, J. Q. JACKSON, E. S. DEWAR, E. B. HART AND F. C. WIGGINS.

The analyses presented in this BULLETIN are of samples collected by the fertilizer inspectors of the Department, under the direction of the Commissioner of Agriculture, during fall months of 1915 and the spring months of 1916. They should receive the careful study of every farmer in the State who uses fertilizers, as by comparing the analyses in the BULLETIN with the claims made for the fertilizers actually used, the farmer can know by or before the time fertilizers are put in the ground whether or not they contain the fertilizing constituents in the amounts they were claimed to be present.

TERMS USED IN ANALYSES

Water-soluble Phosphoric Acid.—Phosphate rock, as dug from the mines, mainly in South Carolina, Florida, and Tennessee, is the chief source of phosphoric acid in fertilizers.

In its raw, or natural, state the phosphate has three parts of lime united to the phosphoric acid (called by chemists tricalcium phosphate). This is very insoluble in water and is not in condition to be taken up readily by plants. In order to render it soluble in water and fit for plant food, the rock is finely ground and treated with sulphuric acid, which acts upon it in such a way as to take from the three-lime phosphate two parts of its lime, thus leaving only one part of the lime united to the phosphoric acid. This one-lime phosphate is what is known as water-soluble phosphoric acid.

Reverted Phosphoric Acid.—On long standing some of this water-soluble phosphoric acid has a tendency to take lime from other substances in contact with it, and to become somewhat less soluble. This latter is known as reverted or gone-back phosphoric acid. This is thought to contain two parts of lime in combination with the phosphoric acid, and is thus an intermediate product between water-soluble and the original rock.

Water-soluble phosphoric acid is considered somewhat more valuable than reverted, because it becomes better distributed in the soil as a consequence of its solubility in water.

Available Phosphoric Acid is made up of the water-soluble and reverted; it is the sum of these two.

In Mixed Fertilizers

For phosphoric acid	5	cents per pound
For nitrogen	21	cents per pound
For potash	25	cents per pound

HOW RELATIVE VALUE IS CALCULATED

In the calculation of relative value it is only necessary to remember that so many per cent means the same number of pounds per hundred, and that there are twenty hundred pounds in one ton (2,000 pounds).

With an 8-2-1.65 goods, which means that the fertilizer contains available phosphoric acid 8 per cent, potash 2 per cent, and nitrogen 1.65 per cent, the calculation is made as follows:

<i>Percentage or Lbs. in 100 Lbs.</i>	<i>Value per 100 Lbs.</i>	<i>Value per Ton, 2,000 Lbs.</i>
8 pounds available phosphoric acid at 5 cents	0.40 \times 20	\$ 8.00
1.65 pounds nitrogen at 21 cents	0.3465 \times 20	6.93
2 pounds potash at 25 cents	0.50 \times 20	10.00
Total value	1.2465 \times 20	\$24.93

Freight and merchant's commission must be added to these prices.

ANALYSIS OF COMMERCIAL FERTILIZERS—FALL SEASON, 1915.

MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water Soluble Nitrogen	Organic Nitrogen	Equivalent to Ammonia	Total Potash		
Brands claiming										
6122	American Fertilizer Co., Norfolk, Va.	Bone and Peruvian Guano.	Wadesboro.	8.66	.58	.61	1.59	1.93	1.66	\$ 17.20
6181	Armour Fertilizer Works, Greensboro, N. C.	Armour's Slaughter House Fertilizer	Norwood.	8.13	.80	.85	1.65	2.00	1.97	16.98
6172	Paugh & Sons Co., Norfolk, Va.	Baugh's Animal Base Compound.	Asheboro.	7.86	.70	.99	1.69	2.05	1.90	17.25
6121	Georgia Chemical Co., Augusta, Ga.	Georgia Formula.	Bennett.	10.71	2.06	.29	2.35	2.86	1.25	17.06
6145	Navassa Guano Co., Wilmington, N. C.	Navassa Cotton-seed Meal Guano.	Mount Taber.	8.66	.56	.93	1.49	1.81	1.20	21.19
6155	do.	Navassa Grain Fertilizer.	Millboro.	9.01	1.20	.41	1.61	1.96	1.82	15.79
6219	Patapasco Guano Co., Baltimore, Md.	Seagull Ammoniated Guano.	Granite Quarry	8.22	1.28	.39	1.67	2.03	1.86	17.67
6220	Palmetto Guano Corporation, Columbia, S. C.	Palmetto Special Fertilizer	Morven.	8.62	.81	.73	1.57	1.91	1.94	17.21
6120	Pamlico Chemical Co., Washington, N. C.	Pamlico Bone and Fish Guano for Wheat	Oakhoro.	8.11	.92	.79	1.71	2.08	1.96	17.34
6196	Royster, F. S., Guano Co., Norfolk, Va.	Farmers' Bone Fertilizer	Roxboro.	7.86	.92	.47	1.59	1.93	2.00	17.50
6154	do.	do.	Julian.	8.16	.91	.57	1.57	1.91	1.72	16.83
6217	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Red Steer Guano.	Richfield.	7.24	.52	1.09	1.61	1.96	2.46	16.31
6119	Union Guano Co., Winston-Salem, N. C.	Fish Brand Ammoniated Guano.	Bennett.	8.05	1.22	.51	1.73	2.10	2.02	17.14
6131	do.	Old Homesty Guano.	Morven.	9.35	1.16	.53	1.69	2.05	1.16	17.60
6141	Va-Car. Chemical Co., Richmond, Va.	A. & A's Old Homesty Guano.	Mount Taber.	8.71	1.18	.33	1.71	2.08	2.06	17.15
6198	do.	Durham Fertilizer Co's Genuine Bone and Peruvian Guano.	Rongmont.	8.06	1.21	.45	1.69	2.05	1.96	18.18
										17.35

ANALYSIS OF COMMERCIAL FERTILIZERS—FALL SEASON, 1915.

MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		Total Potash
Brands claiming									
6129	American Agricultural Chemical Co., New York, N. Y.	Zell's Bone and Potash	Stanfield	10.00				2.00	\$ 12.40
6128	American Fertilizer Co., Norfolk, Va.	Dissolved Bone and Potash for Corn and Wheat.	Monroe	10.38				1.40	11.72
6180	Armour Fertilizer Works, Greensboro, N. C.	Armour's Phosphate and Potash Fertilizers.	Norwood	11.34				1.22	12.28
6127	Berkley Chemical Co., Norfolk, Va.	Laurel Mixture	Kings	9.77				1.66	11.61
6174	Imperial Co., Norfolk, Va.	Imperial Bone and Potash	Mount Gilead	10.70				1.62	12.38
6125	Navassa Guano Co., Wilmington, N. C.	Dissolved Bone and Potash	Oakboro	10.21				1.82	12.28
6126	Norfolk Fertilizer Co., Norfolk, Va.	Oriana Bone and Potash	Oakboro	11.20				1.58	12.77
6186	Ober, G., & Sons Co., Baltimore, Md.	Ober's Dissolved Bone Phosphate and Potash.	Denton	10.39				1.76	12.34
6124	Pamlico Chemical Co., Washington, N. C.	Pamlico Bone and Potash.	Oakboro	11.26				1.83	13.24
6159	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Bone and Potash Mixture	Oakboro	12.51				1.30	13.47
6153	Va.-Car. Chemical Co., Richmond, Va.	A. & A.'s McGavock's Special Potash Mixture	Marshville	10.13				1.50	11.67
6200	do.	Durham Fertilizer Co.'s Standard Wheat Grower.	Julian	10.82				1.66	12.56
6173	do.	Southern Chemical Co.'s Mammoth Wheat and Grass Grower.	Oxford	11.32				1.20	12.23
6146	do.	V.-C. C. Co.'s Dissolved Bone and Potash.	Seagrove	10.24				1.80	12.28
			Rowland	11.88				2.06	14.19
Brand claiming									
6134	Armour Fertilizer Works, Greensboro, N. C.	Armour's Phosphate and Potash	Albemarle	11.00				1.00	11.60
				9.41				.76	9.76

Brand claiming.....		12.00	2.00	14.20
6201	Royster, F. S., Guano Co., Norfolk, Va.....	Royster's Bone and Potash Mixture.....	Roxboro.....	11.56
RAW OR UNMIXED FERTILIZER MATERIALS.				
Brands claiming				
6183	American Fertilizing Co., Norfolk, Va.....	Eagle Brand Acid Phosphate.....	Cid.....	\$ 10.40
Brands claiming				
6138	American Fertilizing Co., Norfolk, Va.....	High Grade Acid Phosphate.....	Wadsworth.....	12.27
6162	Royster, F. S., Guano Co., Norfolk, Va.....	Royster's 11 Per Cent Acid Phosphate.....	Ore Hill.....	13.17
6137	Union Guano Co., Winston, N. C.....	Union 14 Per Cent Acid Phosphate.....	Wadsworth.....	12.17
Brands claiming				
6205	American Agricultural Chemical Co., New York, N. Y.....	Detrick's 16 Per Cent Acid Phosphate.....	Rockwell.....	12.80
6182	American Fertilizing Co., Norfolk, Va.....	American High Grade Acid Phosphate.....	Cid.....	12.51
6387	Armour Fertilizer Works, Greensboro, N. C.....	Armour's 16 Per Cent Acid Phosphate.....	Saunderland.....	12.06
6166	do.....	do.....	Marshville.....	12.80
6181	Baugh & Sons Co., Philadelphia, Pa.....	Baugh's 16 Per Cent Acid Phosphate.....	Cid.....	12.54
6206	Brown, H. P., Guano Co., Salisbury, N. C.....	Brown's 16 Per Cent Acid Phosphate.....	Granite Quarry.....	13.71
6165	Bryant Fertilizer Co., Alexandria, Va.....	Bryant's Acid Phosphate.....	Siler City.....	12.89
6204	Caraligh Phosphate and Fertilizer Works, Raleigh, N. C.....	16 Per Cent Acid Phosphate.....	Warrington.....	11.13
6215	do.....	do.....	Granite Quarry.....	13.60
6214	Carolina Union Fertilizer Co., Norfolk, Va.....	Carolina Union 16 Per Cent.....	Albemarle.....	13.68
6164	Coöperative Warehouse Co., Salisbury, N. C.....	Farmers' Union 16 Per Cent Acid Phosphate.....	Siler City.....	12.99
6213	Cotton States Fertilizer Works, Wilmington, N. C.....	Cotton States Acid Phosphates, High Grade.....	Richfield.....	13.12
6153	Craven Chemical Co., New Bern, N. C.....	Panama 16 Per Cent Acid Phosphate.....	Sauferd.....	13.58
6211	Farmers' Union Warehouse Co., Statesville, N. C.....	Farmers' Union 16 Per Cent Acid Phosphate.....	Rockwell.....	13.16
6179	Georgia Chemical Works, Augusta, Ga.....	High Grade Bone Phosphate.....	Asheboro.....	13.75

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-Soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		Total Potash
Brand claiming									
6815	Coe-Mortimer Co., Charleston, S. C.	Coe-Mortimer Co.'s 9-2-1 Fertilizer.	Wilson.	8.00	1.00	.66	1.65	2.00	1.00 \$ 19.93
Brands claiming									
6373	American Agricultural Chemical Co., New York, N. Y.	Detrick's Rival Tobacco Compound	Smithfield.	9.29	.96	.70	1.66	2.02	1.80 25.26
6737	American Agricultural Chemical Co., Henderson, N. C.	Hot Stuff for Tobacco.	Henderson.	8.32	1.01	.70	1.74	2.11	2.10 26.13
6685	do.	do.	Henderson.	8.10	.98	.68	1.66	2.02	1.94 24.77
6388	do.	do.	Oxford.	8.50	.93	.72	1.65	2.00	2.98 30.33
6552	American Agricultural Chemical Co., Baltimore, Md.	do.	Cardenas.	9.16	1.10	.86	1.96	2.38	2.08 27.79
6837	American Agricultural Chemical Co., Henderson, N. C.	do.	Oxford.	8.25	1.06	.81	1.90	2.31	2.18 27.13
6804	American Agricultural Chemical Co., Baltimore, Md.	do.	Apex.	9.05	1.18	.48	1.66	2.02	2.04 26.22
6372	American Agricultural Chemical Co., Henderson, N. C.	do.	Selma.	9.26	1.22	.64	1.86	2.26	1.82 26.17
6805	American Agricultural Chemical Co., Baltimore, Md.	do.	Apex.	8.56	.61	1.10	1.74	2.11	1.88 25.77
6648	American Agricultural Chemical Co., Henderson, N. C.	do.	Hester.	8.15	.96	.74	1.70	2.07	2.08 25.69
6635	American Agricultural Chemical Co., New York, N. Y.	do.	Whitakers.	8.48	.90	.74	1.64	1.99	1.96 25.17
6722	American Agricultural Chemical Co., Baltimore, Md.	do.	Oxford.	7.99	.91	.76	1.67	2.03	1.94 24.70
6708	do.	Slingluff's British Mixture.	Rougemont.	8.30	1.11	.84	1.95	2.37	2.06 26.79
6386	American Agricultural Chemical Co., New York, N. Y.	Zell's Special Compound for Tobacco	Pilot Mountain.	8.25	1.17	.53	1.70	2.07	1.80 24.39
6920	do.	do.	Stovall.	7.95	9.95	.80	1.75	2.13	2.00 25.30

6718	American Agricultural Chemical Co., Baltimore, Md.	do.	Oxford.	7.93	1.14	.58	1.72	2.09	1.98	25.05
6697	American Agricultural Chemical Co., New York, N. Y.	do.	Henderson.	8.36	1.01	.58	1.62	1.97	1.88	24.56
6419	American Fertilizing Co., Norfolk, Va.	Bone and Peruvian Guano.	Summerfield.	8.71	1.09	.55	1.64	1.99	1.82	24.70
6637	do.	do.	Henderson.	9.34	1.06	.46	1.52	1.85	1.76	24.52
6694	do.	do.	Stovall.	7.48	1.30	.62	1.92	2.33	2.20	26.54
7014	do.	do.	Pilot Mountain.	9.45	.92	.56	1.48	1.80	1.74	24.37
6582	do.	Hannah's Special Formula Guano.	Reidsville.	9.00	.84	.56	1.40	1.70	1.96	24.68
6289	Armour Fertilizer Works, Greensboro, N. C.	Armour's Slaughter House Fertilizer.	Greensboro.	7.78	.95	.71	1.66	2.02	1.78	23.65
6744	do.	Armour's Slaughter House for Tobacco Fertilizer.	Stem.	7.47	.82	.80	1.62	1.97	1.88	23.67
6747	do.	do.	Stem.	7.91	.81	.90	1.74	2.11	2.12	25.82
6919	do.	do.	Germananton.	7.61	.57	1.16	1.73	2.10	2.00	24.89
6934	do.	do.	Creedmoor.	7.95	.59	.90	1.49	1.81	1.98	24.11
6374	do.	do.	Smithfield.	7.18	.33	1.06	1.39	1.63	1.62	21.12
6818	Atlantic Chemical Corporation, Norfolk, Va.	Atlantic Soluble Guano for Tobacco.	Lucama.	8.28	.48	1.12	1.60	1.94	1.85	24.28
6290	do.	do.	Burlington.	8.05	1.21	.45	1.66	2.02	1.55	22.52
6768	do.	do.	Reidsville.	7.90	.82	.76	1.58	1.92	1.80	23.54
6375	Atlantic Fertilizer Works, Wilmington, N. C.	Atlantic Cotton and Corn Fertilizer, 8-2-2	Smithfield.	5.94	.43	1.30	1.73	2.10	2.28	24.61
6693	Baugh & Sons Co., Baltimore, Md.	Baugh's Old Standby Compound for Tobacco.	Stovall.	8.49	1.06	.80	1.86	2.26	1.90	25.80
6716	do.	do.	Bullocks.	8.40	1.12	.70	1.82	2.21	1.84	25.21
6752	do.	do.	Tar River.	8.10	1.09	.70	1.79	2.18	1.82	24.72
6643	do.	do.	Oxford.	8.55	1.10	.66	1.76	2.14	2.00	25.94
6759	do.	do.	Oxford.	8.42	.96	.72	1.68	2.04	2.06	25.78
6760	do.	do.	Tar River.	7.91	1.34	.62	1.96	2.38	1.92	25.74
6717	do.	do.	Dabney.	8.56	1.12	.66	1.78	2.16	1.88	25.41
6682	do.	do.	Oxford.	8.52	1.06	.64	1.70	2.07	1.94	25.36
6450	do.	do.	Lucama.	7.90	1.12	.64	1.76	2.14	2.00	25.29

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Equivalent to Ammonia	Total Potash		
Brands claiming										
6762	Baugh & Sons Co., Baltimore, Md.	Baugh's Old Standby Compound for Tobacco.	Tar River.	8.00	1.04	.68	1.72	2.09	1.94	25.27
6918	do.	do.	Stovall.	8.48	.93	.78	1.71	2.08	1.90	25.16
6755	do.	do.	Tar River.	8.33	1.10	.74	1.84	2.24	1.80	25.06
6683	do.	do.	Henderson.	8.47	1.06	.62	1.68	2.04	1.88	24.93
6540	do.	do.	Thomasville.	7.95	1.01	.66	1.70	2.07	1.96	24.89
6931	do.	do.	Oxford.	8.46	.91	.76	1.67	2.03	1.88	24.87
6738	do.	do.	Oxford.	8.30	.92	.64	1.56	1.89	1.98	24.75
6763	do.	do.	Tar River.	8.32	1.14	.60	1.74	2.11	1.82	24.73
6917	do.	do.	Stovall.	8.81	.81	.84	1.65	2.00	1.76	24.54
6639	do.	do.	Oxford.	8.37	.92	.72	1.64	1.99	1.84	24.46
6692	do.	do.	Stovall.	8.06	.90	.72	1.62	1.97	1.86	24.16
6904	Brown, H. P., Salisbury, N. C.	Brown's 8-2-2 Guano, Standard Grade.	Elkin.	8.12	.28	1.74	2.02	2.46	1.74	25.30
6480	do.	do.	Elkin.	8.05	.73	.98	1.71	2.08	1.92	24.83
6368	Bryant Fertilizer Co., Alexandria, Va.	Bryant's Cotton Grower.	Dunn.	9.27	1.15	.37	1.52	1.85	1.70	24.15
6766	do.	Bryant's Potomac Bone Special Tobacco.	Burlington.	9.16	1.10	.46	1.56	1.89	1.78	24.61
6666	Burton, C. J., Guano Co., Baltimore, Md.	Burton's Butcher Bone.	Burlington.	7.99	1.28	.46	1.74	2.11	1.84	24.60
6712	Carolina Union Fertilizer Co., Norfolk, Va.	Carolina Union 2-8-2.	Mount Airy.	8.17	.92	.64	1.56	1.89	1.76	23.92
6708	Columbia Guano Co., Norfolk, Va.	Columbia Soluble Guano for Tobacco.	Mebane.	8.29	.38	1.16	1.54	1.87	1.90	24.26

6770	do.	Columbia Soluble Guano.	Roxboro.	8.00	.82	.72	1.54	1.87	1.82	23.57
6472	Coöperative Warehouse Co., Salisbury, N. C.	Farmers' Union 8-2-2 High Grade Guano.	Nashville.	8.73	.31	1.70	2.04	2.48	2.00	27.30
6712	do.	Farmers' Union 8-2-2 Tobacco Guano.	Oxford.	7.96	.91	.80	1.71	2.08	2.00	25.11
6463	do.	do.	Nashville.	7.87	.78	.90	1.68	2.04	1.88	24.33
6681	do.	do.	Middleburg.	8.05	.21	1.36	1.60	1.91	1.90	24.27
6680	do.	do.	Dabney.	6.86	.68	.94	1.62	1.97	2.04	23.86
7050	do.	Farmers' Union 8-2-2 Standard Grade Guano.	Wilson.	8.11	.42	1.40	1.82	2.21	2.00	25.75
7035	do.	do.	Battleboro.	7.95	.21	1.38	1.62	1.97	2.06	25.65
6804	do.	do.	Battleboro.	8.16	.86	.78	1.64	1.99	1.96	24.85
6475	do.	do.	Nashville.	8.13	.77	.98	1.75	2.13	1.80	24.48
6481	do.	do.	Wake Forest.	7.29	.42	1.30	1.72	2.09	1.98	24.41
7051	do.	do.	Wilson.	6.94	.56	1.11	1.70	2.07	1.86	23.38
6850	do.	do.	Beulaville.	8.98	1.14	.41	1.58	1.92	1.32	22.22
6440	do.	do.	Nashville.	7.36	1.44	.40	1.90	2.31	1.16	21.14
6865	do.	do.	Battleboro.	8.72	.80	1.02	1.82	2.21	1.92	25.96
6906	do.	Farmers' Union 8-2-2 Tobacco Guano.	Nashville.	7.98	.90	.88	1.78	2.16	1.86	24.76
6459	do.	do.	Nashville.	7.78	.92	.82	1.74	2.11	1.94	24.39
6479	Cotton States Fertilizer Works, Wilmington, N. C.	Cotton and Corn Fertilizer, Standard Grade.	Mount Airy.	7.09	.43	1.20	1.63	1.98	2.18	24.83
6411	Farmers' Union Agency Co., Winston-Salem, N. C.	Farmers' Union Agency Co.'s 8-2-2.	Winston-Salem.	6.98	.31	1.35	1.66	2.02	1.42	21.05
6517	Georgia Chemical Works, Augusta, Ga.	Georgia Formula.	Lumber Bridge.	8.98	1.24	.56	1.80	2.19	1.94	26.24
6903	do.	Georgia Special Tobacco.	No. Wilkesboro.	9.26	1.18	.54	1.72	2.09	1.82	25.58
7011	do.	do.	Pilot Mountain.	10.02	.62	1.10	1.72	2.09	1.60	25.24
7010	do.	do.	Mount Airy.	8.70	1.16	.52	1.68	2.04	1.94	24.46
7009	Hampton Guano Co., Norfolk, Va.	Extra Tobacco Guano.	Winston-Salem.	8.98	1.20	.41	1.64	1.99	1.94	25.57
6565	do.	do.	Reidsville.	9.11	1.10	.38	1.48	1.80	1.52	22.96
6836	Imperial Company, Norfolk, Va.	Imperial Cisco Soluble Guano.	Oxford.	8.48	.98	.82	1.80	2.19	1.94	25.71

6974	do.	do.	Lucama	10.18	.94	.46	1.40	1.70	1.04	21.26
6715	Norfolk Fertilizer Co., Norfolk, Va.	Oriana Crop Grower	Mount Airy	8.19	1.92	.74	1.76	2.14	1.92	25.18
6392	Old Buck Guano Co., Richmond, Va.	Old Buck Saxon Tobacco	Lucama	7.90	.87	.97	1.84	2.24	2.04	25.83
6902	do.	do.	Walnut Cove	8.48	1.18	.60	1.78	2.16	2.00	25.96
6537	do.	do.	High Point	8.41	1.04	.60	1.64	1.99	1.94	25.00
6809	do.	do.	Lucama	7.54	.80	1.08	1.88	2.29	1.80	24.44
6402	do.	do.	Pilot Mountain	8.13	.95	.66	1.61	1.96	1.86	24.19
6556	Palmetto Corporation, Columbia, S. C.	Palmetto Special Fertilizer	Bailey	8.36	.96	.80	1.76	2.14	1.88	25.15
6607	Pandico Chemical Co., Washington, N. C.	Pandico Bone and Fish Guano	Washington	7.85	1.16	.62	1.78	2.16	2.00	25.33
6409	do.	do.	Washington	8.21	.71	.96	1.67	2.03	1.76	24.02
6460	Patapco Guano Co., Baltimore, Md.	Sea Gull Ammoniated Guano	Mount Airy	9.06	.91	.78	1.69	2.05	1.84	25.36
6402	do.	Planters' Favorite	Pilot Mountain	8.80	.99	.76	1.75	2.13	1.80	25.15
6459	do.	Sea Gull Ammoniated Guano	Benson	9.11	.87	.78	1.65	2.01	1.74	24.74
6719	do.	Planters' Favorite	Oxford	8.13	.95	.64	1.59	1.93	1.86	24.11
6567	Pocomoke Guano Co., Norfolk, Va.	Pocomoke 2-8-2 Fertilizer	Redsville	8.88	1.36	.48	1.84	2.24	2.20	27.61
6856	do.	do.	Battleboro	8.99	1.40	.42	1.82	2.21	1.92	26.23
7034	do.	do.	Battleboro	8.96	1.24	.41	1.68	2.04	1.98	25.92
6916	do.	do.	Germanton	8.19	.81	.96	1.80	2.19	1.92	25.65
6703	do.	do.	Stem	9.27	1.28	.34	1.62	1.97	1.72	24.67
6384	Rasin-Monumental Co., Baltimore, Md.	Rasin Empire Guano for Tobacco	Smithfield	8.61	1.61	.41	2.02	2.16	2.22	25.19
6430	do.	do.	Nashville	8.03	.35	1.31	1.96	2.02	2.10	25.50
6454	do.	do.	Nashville	9.63	1.12	1.22	2.34	2.81	1.20	25.46
6910	do.	Rasin's Old Empire Tobacco Guano	Lucama	7.91	.80	1.50	2.30	2.80	1.68	25.97
6431	do.	do.	Nashville	7.20	.39	1.17	1.86	2.26	1.98	24.91
6270	Read Phosphate Co., Charleston, S. C.	Read's Blood and Bone Fertilizer No. 1	Morven	7.52	.47	1.13	2.16	2.64	2.16	25.04
6565	do.	do.	Rockingham	7.93	1.23	1.10	2.33	2.83	2.18	28.62

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Total Potash	Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia			
Brands claiming											
6889	Richmond Guano Co., Richmond, Va.	Premium Tobacco Fertilizer	Durham	8.00	1.65	2.00	2.00	2.00	2.00	\$ 24.93	
7005	Reidsville Fertilizer Co., Reidsville, N. C.	Reidsville Champion Guano	Mount Airy	8.91	1.52	.28	1.80	2.19	1.72	25.19	
6733	Robertson Fertilizer Co., Norfolk, Va.	Double Dollar Tobacco Guano	Virginia, Va.	8.62	1.04	.58	1.62	1.97	1.84	24.62	
6724	do.	do.	Virginia, Va.	8.33	1.00	.54	1.54	1.87	2.28	26.20	
6565	do.	do.	Leaksville	8.78	1.11	.52	1.63	1.98	1.98	25.53	
6735	do.	do.	Virginia, Va.	7.95	.91	.56	1.50	1.82	1.96	24.00	
6577	do.	do.	Virginia, Va.	8.46	1.05	.60	1.65	2.01	1.82	24.49	
6728	do.	do.	Kings Mountain	7.98	1.10	.56	1.66	2.02	1.82	24.05	
6727	do.	do.	Virginia, Va.	7.88	.96	.66	1.62	1.97	1.86	23.98	
6545	Royster, F. S., Guano Co., Norfolk, Va.	Farmers' Bone Fertilizer	Virginia, Va.	7.80	.92	.52	1.44	1.75	2.00	23.85	
6634	do.	Royster's Farmers' Bone Fertilizer for Tobacco	Cardenas	8.32	1.24	.62	1.86	2.26	1.94	25.83	
6689	do.	do.	Oxford	8.38	1.38	.56	1.94	2.36	1.82	25.63	
6418	do.	do.	Henderson	8.11	1.01	1.50	2.51	3.05	2.14	29.65	
6258	do.	do.	Burlington	9.23	.53	1.27	1.80	2.19	1.88	26.19	
6365	do.	do.	New Bern	7.99	1.17	.57	1.74	2.11	1.98	25.20	
6739	do.	do.	Smithfield	7.96	1.03	.61	1.64	1.99	1.92	24.45	
6546	do.	do.	Oxford	8.17	1.48	.58	2.06	2.46	1.98	26.72	
	do.	do.	Fuquay Springs	8.28	.52	1.18	1.70	2.07	2.04	25.62	

6764	.....do.....	Oxford.....	8.79	.86	1.30	2.16	2.63	1.68	26.26
7031	.....do.....	Battleboro.....	8.08	1.28	.68	1.96	2.38	1.94	26.01
6223	.....do.....	Kernersville.....	8.04	1.05	.59	1.64	1.99	2.08	25.33
6555	.....do.....	Asheboro.....	8.26	1.10	.58	1.68	2.04	1.98	25.22
6756	.....do.....	Tar River.....	7.63	1.32	.62	1.94	2.36	1.82	24.88
6732	.....do.....	Virginia, Va.....	8.33	.89	.80	1.69	2.05	1.82	24.53
6740	.....do.....	Oxford.....	7.86	1.13	.56	1.69	2.05	1.90	24.46
6736	.....do.....	Virginia, Va.....	7.70	1.06	.70	1.76	2.11	1.78	23.99
6723	.....do.....	Oxford.....	8.35	.74	.82	1.56	1.89	1.62	23.00
6807	Southern Cotton Oil Co., Goldsboro, N. C., Wilson Oil Mill Standard C. S. M.....	Lucama.....	5.00	.48	1.16	1.64	1.99	2.50	24.39
6909	Southern Cotton Oil Co., Wilson, N. C.....	Lucama.....	7.52	.48	1.18	1.66	2.02	1.78	23.39
6706	Swift & Co. Fertilizer Works, Atlanta, Ga.....	Oxford.....	8.12	.67	1.64	2.31	2.81	2.46	30.12
6397	.....do.....	Thomasville.....	7.41	1.35	.89	2.24	2.72	1.98	26.72
6688	.....do.....	Henderson.....	8.02	.71	1.12	2.13	2.59	1.94	26.67
6636	.....do.....	Oxford.....	8.01	1.06	.82	1.88	2.29	1.98	25.81
6753	.....do.....	Stem.....	8.35	.83	.94	1.77	2.15	1.94	25.18
6663	.....do.....	Watkins.....	8.65	.36	1.24	1.60	1.91	2.02	25.47
6665	.....do.....	Watkins.....	8.16	.80	.94	1.71	2.11	1.98	25.37
6654	.....do.....	Oxford.....	8.18	.88	.84	1.72	2.09	1.92	25.00
6649	.....do.....	Oxford.....	8.13	.82	.81	1.66	2.02	1.98	25.00
6627	.....do.....	Oxford.....	8.68	.92	.80	1.72	2.09	1.72	24.50
6662	.....do.....	Watkins.....	7.28	.18	1.40	1.58	1.92	1.96	23.72
6655	.....do.....	Oxford.....	8.18	.94	.94	1.88	2.21	2.06	26.38
6543	.....do.....	Cardenas.....	8.36	.92	.98	1.90	2.31	1.98	26.24
6380	.....do.....	Oxford.....	7.77	.85	.96	1.81	2.20	2.18	26.27
6745	.....do.....	Stem.....	8.17	.93	.82	1.75	2.13	2.12	26.12

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.

MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100						Relative Value per Ton at Factory
				Available Phosphate	Water-Soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	
Brands claiming										
6583	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Red Steer for Tobacco Standard Grade Guano.	Cardenas	8.00	1.02	.84	1.86	2.26	2.16	\$ 24.93
6646	do.	do.	Oxford	8.53	.81	.92	1.76	2.14	1.96	25.78
6929	do.	do.	Lyons	8.31	.81	.90	1.71	2.08	2.02	25.72
6927	do.	do.	Lyons	8.36	.85	.94	1.79	2.18	1.90	25.59
6720	do.	do.	Oxford	7.94	1.06	.76	1.82	2.21	1.96	25.38
6741	do.	do.	Stem	8.05	.85	.80	1.65	2.00	2.08	25.38
6926	do.	do.	Lyons	7.98	.83	.92	1.75	2.13	2.00	25.33
6743	do.	do.	Stem	8.01	.83	.86	1.69	2.05	2.02	25.21
7019	do.	do.	Creedmoor	8.26	.82	.86	1.64	1.99	1.96	24.95
6726	do.	do.	Oxford	7.92	.93	.86	1.79	2.18	1.90	24.94
6748	do.	do.	Stem	8.08	.79	.88	1.67	2.03	1.96	24.89
6746	do.	do.	Stem	8.05	.75	.96	1.71	2.08	1.90	24.73
6705	do.	do.	Oxford	7.70	.83	.98	1.81	2.20	1.88	24.70
6928	do.	do.	Lyons	7.79	.85	.92	1.77	2.15	1.88	24.62
6420	do.	do.	Mooresville	7.63	.45	1.26	1.71	2.08	1.94	24.51
6725	do.	do.	Oxford	8.10	.71	.96	1.67	2.03	1.84	24.31
6711	do.	do.	Ridgemont	8.03	.36	1.24	1.60	1.94	1.82	23.85

6640	do.	Oxford	7.81	.90	.84	1.74	2.11	1.74	23.82
6715	do.	Oxford	7.99	.81	.84	1.65	2.00	1.78	23.82
6730	do.	Oxford	7.98	.65	.96	1.61	1.96	1.74	23.44
6680	do.	Watkins	8.83	.38	1.04	1.42	1.73	1.70	23.29
6714	do.	Oxford	6.31	.39	1.28	1.67	2.03	1.92	22.92
6658	do.	Watkins	7.39	.78	1.04	1.82	2.21	1.50	22.53
6666	do.	Watkins	6.85	.94	1.08	2.02	2.46	1.16	21.13
7057	do.	Walnut Cove	8.55	.36	1.24	1.60	1.94	1.30	21.77
6661	do.	Watkins	6.93	.92	1.00	1.98	2.41	1.02	20.35
6847	Tennessee Chemical Co., Greensboro, N. C.	Julian	7.05	.82	.80	1.62	1.97	2.00	24.65
6471	Tuscarora Fertilizer Co., Greensboro, N. C.	Elkin	7.26	.69	.82	1.51	1.81	1.92	23.20
6494	do.	Pilot Mountain	7.75	.72	.74	1.46	1.78	1.96	23.68
6455	Tennessee Chemical Co., Greensboro, N. C.	Mount Airy	7.89	.65	.88	1.53	1.86	2.01	24.52
7042	Union Guano Co., Winston-Salem, N. C.	Elm City	9.58	.58	1.16	1.74	2.11	1.58	24.79
7047	do.	Wilson	8.31	.76	.86	1.62	1.97	1.60	23.11
6843	do.	Fish Brand Ammoniated Guano for Tobacco.	9.23	1.26	.48	1.74	2.11	1.76	25.34
6659	do.	Reidsville	8.95	1.30	.46	1.76	2.14	2.06	26.64
6796	do.	Apex	7.95	1.11	.50	1.64	1.99	2.48	26.21
6795	do.	Apex	8.96	1.06	.50	1.56	1.89	2.21	26.71
6552	do.	Ashboro	9.20	1.04	.56	1.60	1.91	1.80	24.92
6914	do.	Old Honesky Tobacco Guano.	8.95	1.10	.58	1.68	2.01	1.86	25.31
7000	do.	Pilot Mountain	9.15	1.10	.54	1.64	1.99	1.80	25.04
6446	do.	Gastonia	8.32	.81	.58	1.39	1.69	1.88	23.56
6899	Va.-Car. Chemical Co., Richmond, Va.	Walnut Cove	8.70	1.30	.50	1.80	2.19	1.92	25.86
6221	do.	Winston-Salem	9.75	1.21	.45	1.66	2.02	1.52	24.32

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.

MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-Soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		Total Potash
Brands claiming										
6664	Va.-Car. Chemical Co., Richmond, Va.	Davie & Whittle's Owl Brand Guano.	Burlington	8.00	—	—	1.65	2.00	2.00	\$ 24.53
6671	do.	do.	Lamberton	8.60	.92	.76	1.68	2.01	1.92	25.26
6624	do.	do.	Wake Forest	7.98	.86	.72	1.58	1.92	1.78	23.52
6348	do.	do.	Angier	8.48	.60	.58	1.18	1.43	2.00	23.44
6283	do.	Durham Fertilizer Co.'s Genuine Bone and Peruvian Guano.	Hillsboro	7.95	1.27	.55	1.82	2.21	2.12	26.19
6671	do.	do.	Henderson	8.20	1.29	.47	1.76	2.11	1.94	25.29
6578	do.	do.	Cardenas	9.35	.98	.40	1.38	1.68	1.98	25.04
6574	do.	do.	Kings Mountain	7.49	.80	.94	1.74	2.11	2.04	25.00
6775	do.	Eurecka Ammoniated Bone	Micro	9.59	1.26	.51	1.80	2.19	1.94	26.85
6729	do.	Farmers' Favorite Fertilizer C. S. M.	Durham	7.96	.34	1.48	1.82	2.21	2.20	26.60
6699	do.	National Special Tobacco Fertilizer	Durham	8.90	1.26	.44	1.70	2.07	1.86	25.34
6750	do.	do.	Durham	9.11	.90	.50	1.40	1.70	1.42	22.09
6888	do.	Old Dominion Guano Co.'s Farmers' Friend High Grade Fertilizer.	Hester	8.25	1.11	.56	1.70	2.07	1.76	24.19
6673	do.	do.	Stem	8.49	1.10	.76	1.86	2.26	1.82	25.40
6765	do.	Southern Chemical Co.'s Electric Tobacco Grower.	Henderson	8.22	.42	1.16	1.58	1.92	2.02	24.96
	do.	Special Tobacco Fertilizer.	Oxford	8.52	1.46	.70	2.16	2.63	1.86	26.89

6407	do.....	J. G. Tinsley & Co.'s Stonewall Tobacco Guano.....	Walnut Cove	8.88	1.45	.45	1.99	2.31	1.92	26.16
6551	do.....	do.....	Troy....	7.28	.78	1.16	1.91	2.36	1.76	24.23
6506	do.....	S. W. Travers & Co.'s Beef, Blood and Bone, B. B. B. Fertilizer.....	Whiteville	9.16	.79	.81	1.63	1.98	1.66	24.31
6832	do.....	S. W. Travers & Co.'s National Special Tobacco Fertilizer.....	Oxford....	8.23	.98	.68	1.66	2.02	2.31	26.90
6905	do.....	do.....	Kenly.....	8.11	1.26	.46	1.72	2.09	2.01	25.53
6378	do.....	do.....	Durham.....	8.76	.85	.41	1.29	1.57	2.11	24.88
6828	do.....	V. C. C. Co.'s Diamond Dust C. S. M.....	Marshville	7.19	.68	1.29	1.88	2.29	2.02	25.19
6754	do.....	V. C. C. Co.'s Farmers' Favorite C. S. M.....	Tar River	7.49	.41	1.31	1.78	2.16	2.02	25.07
6338	do.....	V. C. C. Co.'s Plant Food C. S. M.....	Maxton	7.77	.49	1.31	1.80	2.19	2.02	25.13
6701	do.....	do.....	Melbane	8.18	.41	.98	1.42	1.73	1.94	24.14
Brand claiming										
6815	Peruvian Guano Corporation, Charleston, S. C.....	Peruvian Special Potash Mixture.....	Everetts	8.81	1.40	.66	2.06	2.50	1.16	23.29
Brands claiming										
6390	American Agricultural Chemical Co., New York, N. Y.....	Slinguff's British Mixture.....	Roxboro	7.83	1.61	.52	2.13	2.59	2.10	27.28
6749	Atlantic Chemical Corporation, Norfolk, Va.....	Atlantic Tobacco Compound.....	Hester	7.70	1.57	.66	2.23	2.71	1.70	25.57
6570	Columbia Guano Co., Norfolk, Va.....	Columbia Special Tobacco Guano.....	Leaksville	7.90	1.16	.59	1.86	2.26	2.00	30.21
7013	do.....	do.....	Pilot Mountain	8.79	1.32	.86	2.18	2.65	2.00	27.95
6463	Navassa Guano Co., Wilmington, N. C.....	Navassa Guano for Tobacco.....	Pilot Mountain	8.19	1.61	.66	2.27	2.76	1.94	27.12
6536	Royster, F. S., Guano Co., Norfolk, Va.....	Royster's Special Tobacco Compound	Thomasville	8.16	1.28	.78	2.06	2.50	1.96	26.91
6456	do.....	do.....	Pilot Mountain	7.97	.95	1.08	2.03	2.17	1.93	26.40
6503	do.....	do.....	Jameville	7.75	1.72	.86	2.58	3.11	1.54	26.29
6350	do.....	do.....	Walthall.....	8.16	1.41	.71	2.12	2.58	1.80	26.06
6709	do.....	do.....	Rougement	8.05	1.50	.60	2.10	2.55	1.80	25.87
6486	do.....	do.....	LaGrange.....	7.85	1.23	.81	2.07	2.52	1.64	24.74

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.

MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-Soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		Total Potash
Brands claiming				8.00	-----	-----	2.05	2.50	2.00	\$ 26.65
6495	Tuscarora Fertilizer Co., Greensboro, N. C.	Tuscarora Fertilizer, 8-2-50-2	Pilot Mountain	7.35	.91	1.10	2.04	2.48	2.12	27.02
7001	do.	do.	Pilot Mountain	7.61	.92	1.12	2.04	2.48	2.16	26.98
6541	Va.-Car. Chemical Co., Richmond, Va.	N. C. Official Farmers' Alliance	Holly Springs	9.36	1.51	.60	2.14	2.60	1.72	26.95
Brands claiming				8.00	-----	-----	2.06	2.50	3.00	31.65
7608	Old Buck Guano Co., Richmond, Va.	Old Buck High Prize Tobacco	Mount Airy	8.40	1.24	.86	2.10	2.55	2.70	30.72
6774	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Orinoco Tobacco Guano	Roxboro	8.13	.70	1.34	2.04	2.48	3.02	31.80
Brands claiming				8.00	-----	-----	2.26	2.75	2.00	27.49
6955	Farmville Oil and Fertilizer Co., Farmville, N. C.	Chamblee Special	Wakefield	7.74	.80	1.96	2.76	3.36	2.26	30.63
6444	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s White Stem C. S. M.	Nashville	7.70	1.80	1.36	3.16	3.84	2.76	34.77
Brand claiming				8.00	-----	-----	2.39	2.91	2.00	28.04
6729	American Agricultural Chemical Co., New York, N. Y.	Bradley's B. D. Sea Fowl Guano, Revised.	Pinnacle	9.36	2.08	.46	2.51	3.09	1.90	29.53
6613	do.	do.	Robertsonville	8.32	1.80	.78	2.58	3.14	1.96	28.96
Brands claiming				8.00	-----	-----	2.47	3.00	.50	20.87
6299	Eastern Cotton Oil Co., Hertford, N. C.	Rainproof Cotton Grower	Columbia	8.00	.37	2.09	2.46	2.99	.58	21.10
6825	Farmers Cotton Oil Co., Wilson, N. C.	F. G. Co.'s C. S. M. Mixture	Lucama	8.40	.74	1.68	2.42	2.94	.62	21.66
6907	Union Seed and Fertilizer Co., Raleigh, N. C.	Union Seed and Fertilizer Co.'s Brand 4.	Lucama	9.19	.96	1.58	2.54	3.09	.48	22.55

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.

MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100						Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	
Brands claiming										
6594	Norfolk Fertilizing Co., Norfolk, Va.	Oriana 3-8-1 Fertilizer	Fayetteville	8.60	1.42	.96	2.38	2.89	.96	23.10
7007	Ober, G., & Sons Co., Baltimore, Md.	Ober's Golden Seal Tobacco Guano	Mount Airy	8.18	1.36	1.14	2.50	3.01	1.91	28.38
6886	do.	do.	Willow Springs	7.11	1.81	1.76	3.60	3.16	1.10	27.73
6428	do.	do.	Hillsboro	9.31	1.47	1.05	2.52	3.06	1.50	27.39
6833	do.	do.	Oxford	8.10	1.72	1.02	2.71	3.33	1.16	26.91
6710	do.	do.	Rougemont	8.97	1.55	1.08	2.63	3.20	1.30	26.52
6765	do.	do.	Hillsboro	8.05	1.54	1.10	2.64	3.21	1.38	26.04
6766	do.	do.	Raleigh	7.96	1.70	1.06	2.76	3.36	1.28	25.95
6533	do.	do.	Vanceboro	9.03	1.22	1.28	2.50	3.04	1.22	25.63
6532	do.	do.	Vanceboro	7.83	1.56	1.00	2.56	3.11	1.38	25.48
6381	do.	do.	Roxboro	8.68	1.55	1.08	2.63	3.20	1.14	25.43
6721	do.	do.	Oxford	8.08	1.53	1.00	2.53	3.08	1.28	25.11
6366	do.	do.	Selma	7.58	1.63	.97	2.60	3.16	1.16	24.30
6690	Old Buck Guano Co., Richmond, Va.	Old Buck Dundee Tobacco	Williamston	8.20	1.50	.90	2.40	2.92	1.04	23.48
6606	Pamlico Chemical Co., Washington, N. C.	Pamlico Surety Crop Grower	Washington	7.86	1.82	.86	2.68	3.26	1.00	24.12
6786	Pearsall & Co., Wilmington, N. C.	Pearsall's High Grade Tobacco Guano	White Oak	6.83	1.14	1.42	2.56	3.11	1.42	24.68

6783	Peruvian Guano Corporation, Charleston, S. C.	Peruvian Special Cotton Mixture	Jamesville	7.93	1.92	.88	2.80	3.40	1.28	26.09
6819	Powhatan Chemical Co., Richmond, Va.	Husler Tobacco Special	Wilson	8.19	1.42	1.20	2.62	3.19	.78	23.09
6810	do.	do.	Wilson	7.94	.96	1.16	2.42	2.91	.94	22.80
7032	do.	do.	Battleboro	7.42	2.11	.80	2.91	3.57	1.00	21.77
6447	do.	do.	Black Creek	7.16	1.36	1.52	2.88	3.50	.92	23.86
6860	do.	do.	Battleboro	7.33	1.92	.70	2.62	3.19	1.08	23.73
6911	do.	do.	Wilson	8.71	1.46	.96	2.42	2.91	.82	22.97
6448	do.	do.	Lucama	8.00	1.20	1.22	2.42	2.91	.94	22.86
6820	do.	P. C. Co.'s Special Fertilizer	Wilson	7.90	1.76	.71	2.50	3.01	.92	23.00
6821	do.	do.	Wilson	7.80	.42	1.02	2.44	2.97	.88	22.45
6451	Rasin-Monumental Co., Baltimore, Md.	Rasin's Indian Brand for Tobacco, Revised	Nashville	8.36	1.61	.10	2.04	2.48	1.08	22.33
6470	do.	do.	Nashville	9.27	1.42	.82	2.24	2.72	1.02	23.78
6271	Read Phosphate Co., Charleston, S. C.	Read's Soil Food	Morven	7.43	1.23	1.01	2.24	2.72	1.10	22.31
6455	Richmond Guano Co., Richmond, Va.	Gilt Edge Tobacco Special	Nashville	7.61	2.01	.70	2.74	3.33	.92	23.72
6323	do.	do.	Benson	8.21	1.42	1.36	2.78	3.38	.82	21.02
6436	do.	do.	Nashville	8.61	1.65	.91	2.56	3.11	.88	23.76
6434	do.	do.	Nashville	7.06	1.31	1.33	2.64	3.21	.92	22.75
6330	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Drill Well Guano	Edenton	8.00	1.39	.91	2.30	2.80	.98	22.56
6225	do.	Royster's Wizard Tobacco Fertilizer	Kernersville	8.36	1.77	.69	2.46	2.99	.98	23.59
6381	Southern Cotton Oil Co., Charlotte, N. C.	S. C. O. Co.'s Ammoniated	Morven	9.54	.23	1.65	1.88	2.29	.96	22.24
6473	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Corn and Cotton Fertilizer, Standard Grade	Elkin	12.15	.57	1.61	2.21	2.69	.80	25.43
6509	do.	do.	Council	7.55	.39	2.42	2.81	3.42	.94	21.05
6542	do.	Swift's Special Tobacco Grower H. G. Guano	Cardenas	8.23	.66	2.18	2.84	3.45	1.20	26.16
6543	do.	do.	Maxton	8.21	1.21	1.25	2.46	2.99	1.38	25.41
6702	Tennessee Chemical Co., Greensboro, N. C.	Ox Fertilizer, S-3-1	Mebane	8.28	1.52	.81	2.36	2.87	1.20	21.19
7011	Union Guano Co., Winston-Salem, N. C.	Farmers' Union, S-3-1	Elm City	9.06	1.18	.96	2.14	2.60	.96	22.85

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.

MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition of Parts per 100					Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		Total Potash
Brands claiming										
6806	Union Guano Co., Winston-Salem, N. C.	Union Special Ammoniated Mixture	Lucama	8.00	1.02	.76	2.47	3.00	1.00	\$ 23.37
6859	Va.-Car. Chemical Co., Richmond, Va.	Norfolk Fertilizer Co.'s Gold Medal Brand Guano	Hope Mills	8.57	.94	1.56	2.50	3.04	.98	23.97
6348	do.	Old Dora Guano Co.'s Farmers' Friend O. D. High Grade Fertilizer C. S. M.	Washington	7.46	1.21	1.41	2.62	3.19	1.38	25.36
6350	do.	V.-C. C. Co.'s Farmers' Friend High Grade Fertilizer, Revised.	Troy	8.70	1.26	1.16	2.42	2.91	1.02	23.96
6742	do.	V.-C. C. Co.'s Menhaden Fish and Meal Mixture.	Elizabeth City	8.08	1.00	1.40	2.40	2.92	1.14	23.86
6358	do.	V.-C. C. Co.'s Royal High Grade Fertilizer, Revised.	Williamston	11.41	1.86	.26	2.12	2.58	.86	24.61
Brands claiming										
6612	American Agricultural Chemical Co., New York, N. Y.	Detrick's Kangaroo Complete Compound for Bright Tobacco.	Robersonville	7.83	1.80	.62	2.42	2.94	2.20	28.99
6624	do.	do.	Fayetteville	8.03	1.36	1.08	2.44	2.97	1.96	28.08
6389	do.	High Grade Tobacco Manure, Vance.	Oxford	8.75	1.53	1.00	2.53	3.08	2.04	29.58
6371	do.	do.	Selma	9.30	1.60	.70	2.30	2.80	1.66	27.26
6670	do.	Zell's Bright Tobacco Grower, Revised.	Henderson	7.93	1.06	1.52	2.58	3.14	2.20	29.77
6701	do.	do.	Oxford	7.71	1.64	1.04	2.68	3.26	2.00	28.97
6669	do.	do.	Henderson	8.16	1.88	.72	2.60	3.16	1.84	28.28
6395	do.	do.	Willow Springs	8.16	1.73	.73	2.46	2.99	1.94	28.19
6709	Armour Fertilizer Works, Greensboro, N. C.	Armour's No. 832 Fertilizer.	Mebane	7.42	.98	1.54	2.52	3.06	1.86	27.30
6529	Atlantic Chemical Works, Norfolk, Va.	Atlantic Fawn Brand Tobacco Guano	Williamston	8.00	1.01	1.22	2.29	2.78	2.08	28.02

6539	Baugh & Sons Co., Philadelphia, Pa.....	Baugh's High Grade Tobacco Grower	Vaneboro	7.89	1.88	.92	2.80	3.40	1.94	29.35
6761	do.....	do.....	Tar River.....	8.50	1.52	.58	2.40	2.92	2.00	28.58
6644	do.....	do.....	Creedmoor	8.31	1.71	.72	2.46	2.99	1.96	28.44
6262	do.....	do.....	New Bern.....	7.58	1.51	.87	2.38	2.89	2.04	27.78
6973	do.....	do.....	Grifton.....	7.98	1.58	.81	2.42	2.91	1.84	27.34
6386	do.....	do.....	Oxford.....	8.01	1.61	.76	2.37	2.88	1.66	27.26
6'32	do.....	do.....	Creedmoor.....	7.94	1.67	.78	2.45	2.98	1.80	27.43
6887	do.....	do.....	Nashville.....	8.26	1.51	.78	2.32	2.82	1.80	27.00
6788	Berkley Chemical Co., Norfolk, Va.....	Berkley 8-3-2 Fertilizer	Williamston.....	7.66	.76	1.68	2.44	2.97	2.18	28.81
6898	do.....	do.....	Bethel.....	8.48	1.90	.80	2.70	3.28	3.02	29.92
6819	Burton, C. J., Guano Co., Baltimore, Md.....	Burton's Best Fertilizer.....	Robersonville.....	7.78	1.91	.50	2.44	2.97	1.84	27.23
6749	Carolina Union Fertilizer Co., Norfolk, Va.....	Carolina Union 3-8-2	Riddle.....	7.05	1.58	.84	2.42	2.94	1.73	26.11
6569	Columbia Guano Co., Norfolk, Va.....	Columbia Tallyho Tobacco Guano	Leaksville.....	7.75	1.58	.76	2.34	2.84	2.16	28.38
6405	do.....	do.....	Benson.....	7.97	1.65	.78	2.43	2.95	1.92	27.73
6707	do.....	do.....	Durham.....	7.79	1.68	.82	2.50	3.01	1.86	27.59
6597	do.....	do.....	Edenton.....	7.93	.72	1.54	2.26	2.75	1.82	26.52
6474	Cooperative Warehouse Co., Salisbury, N. C.....	Farmers' Union 8-3-2 Guano, High Grade	Castalia.....	8.30	1.20	1.42	2.32	2.82	2.10	28.54
6851	do.....	do.....	Beulaville.....	8.17	1.78	.81	2.62	3.19	1.70	27.67
6942	do.....	do.....	Battleboro.....	7.48	.55	1.98	2.53	3.08	1.73	27.01
6972	Cotton Oil and Fertilizer Mills, New Bern, N. C.....	Superb Tobacco Grower.....	Fort Barnwell.....	8.53	.58	1.68	2.18	2.65	2.19	28.20
6560	Craven Chemical Co., New Bern, N. C.....	C. E. Foy's "C. E. F." High Grade Revised.....	Grifton.....	8.00	.20	1.28	2.18	3.02	2.01	28.92
6870	do.....	Duplin Tobacco Guano Revised.....	Seven Springs.....	8.18	1.72	.98	2.70	3.28	1.82	28.92
6418	do.....	do.....	Richlands.....	8.22	1.41	1.42	2.53	3.08	1.98	28.75
6561	do.....	Gaston High Grade Fertilizer Revised.....	Bailey.....	9.08	1.72	.90	2.62	3.19	2.58	31.68
6787	Farmers Guano Co., Raleigh, N. C.....	F. G. C. Farmers' 8-3-2 Guano.....	Williamston.....	7.35	1.26	1.46	2.72	3.31	1.94	28.47
6782	Farmville Oil and Fert. Co., Farmville, N. C.....	High Grade Tobacco Guano.....	Farmville.....	7.70	.76	1.70	2.46	2.99	1.56	25.83

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Total Potash	Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-Soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia			
Brands Claiming											
6400	Georgia Chemical Works, Augusta, Ga.	Gold Leaf Tobacco Compound, Revised.	Kinston	8.57	1.49	.86	2.35	2.85	1.86	27.72	
6421	do.	do.	Trenton	7.53	1.37	1.25	2.62	3.19	1.73	27.43	
6423	do.	do.	Trenton	10.78	1.21	.53	1.74	2.11	1.36	24.89	
6537	Imperial Company, Norfolk, Va.	Imperial 3-8-2 Fertilizer.	Bailey	8.51	2.00	.78	2.78	3.38	2.02	30.29	
6642	do.	do.	Oxford	8.50	1.63	.76	2.44	2.97	2.04	28.95	
6611	do.	do.	Williamston	7.79	1.56	.90	2.46	2.99	2.03	28.55	
6704	Marietta Fertilizer Co., Greensboro, N. C.	Marietta Fertilizer No. 832	Oxford	7.83	1.06	1.00	2.06	2.50	2.03	26.93	
66417	Meadows, E. H. & J. A., Co., New Bern, N. C.	Meadows' Gold Leaf Tobacco Grower	Vanceboro	7.57	1.29	1.60	2.89	3.51	2.18	30.61	
6537	do.	do.	Snow Hill	7.28	1.06	1.70	2.76	3.36	2.31	30.57	
6312	Miller Fertilizer Co., Baltimore, Md.	Miller's Standard	Whitakers	8.11	2.01	.55	2.56	3.11	2.10	29.36	
6930	do.	do.	Creedmoor	7.70	2.05	.50	2.55	3.10	1.76	27.21	
6524	Navassa Guano Co., Wilmington, N. C.	Clarendon Tobacco Guano, Revised	Williamston	6.91	1.75	1.10	2.85	3.46	2.28	30.23	
6597	do.	do.	Wilmington	9.45	1.20	.81	2.04	2.48	1.54	25.72	
6547	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Supreme Tobacco Grower	Beulahville	7.93	.90	2.16	3.06	3.72	2.31	32.48	
6535	do.	do.	Chocowinity	8.09	1.12	1.62	2.74	3.33	2.38	31.50	
6489	do.	do.	Kinston	8.00	.67	1.78	2.45	2.98	2.20	29.29	
6553	Ober, G., & Sons Co., Baltimore, Md.	Ober's Red Indian Tobacco Compound	Kinston	8.80	1.54	1.12	2.66	3.23	2.52	32.57	

6823	Old Buck Guano Co., Richmond, Va.	Old Buck Wortham's Tobacco	Lucama	7.76	1.30	1.24	2.51	3.09	1.98	28.33
6679	do	do	Bear Pond	7.34	1.45	.91	2.42	2.91	2.26	28.80
6678	do	do	Gills Siding	7.72	1.60	.78	2.33	2.89	1.92	27.32
6689	do	do	Williamston	8.39	.74	1.80	2.51	3.09	1.58	26.87
6605	Pamlico Chemical Co., Washington, N. C.	Pamlico Prosperity Tobacco Guano	Washington	7.60	1.61	1.60	2.61	3.21	2.25	24.99
6868	do	do	Gritton	7.91	1.10	1.52	2.62	3.19	1.98	28.81
6873	do	do	Ellerbe	7.25	.92	1.42	2.34	2.81	2.22	28.18
6555	do	do	Gritton	8.01	1.06	1.16	2.52	3.06	1.86	27.83
6912	Patapasco Guano Co., Baltimore, Md.	Patapasco High Grade Tobacco Special	Lucama	8.15	1.64	.86	2.70	3.64	2.12	24.55
6449	do	do	Lucama	8.62	1.72	.81	2.56	3.11	1.95	24.17
6913	do	do	Lucama	8.31	1.58	.94	2.52	3.06	2.60	28.92
6347	Pearsall & Co., Wilmington, N. C.	Pearsall's Tobacco Guano	Kerr	6.91	1.20	1.15	2.35	2.86	1.62	24.83
6343	do	do	Kerr	6.36	.68	1.31	1.93	2.12	1.92	24.32
6345	do	do	Kerr	7.15	.98	1.17	2.15	2.61	1.62	24.28
6800	do	Pearsall's Two-step	Kerr	8.79	.58	1.64	2.22	2.70	1.63	26.51
6341	do	Pearsall's Use-Me High Grade Guano	Kerr	5.77	1.10	1.25	2.65	3.22	2.12	27.50
6341	do	do	Kerr	6.95	1.03	1.19	2.19	2.66	1.81	25.35
6342	do	do	Kerr	6.74	.58	1.23	1.81	2.20	1.98	24.24
6346	do	do	Kerr	6.81	.60	1.37	1.97	2.19	1.72	23.69
6401	Peruvian Guano Corporation, Charleston, S. C.	Piquero Peruvian Compound	Benson	9.57	2.91	.42	2.43	2.95	2.12	30.38
7033	do	Pioneer Peruvian Compound	Battleboro	9.10	1.36	.92	2.23	2.77	2.30	30.18
6410	Pocomoke Guano Co., Norfolk, Va.	Pocomoke 3-8-2 Fertilizer	Richlands	8.08	1.75	.70	2.45	2.98	1.75	27.17
6363	Rasin-Monumental Co., Baltimore, Md.	Indian Brand for Tobacco	Smithfield	9.18	1.99	.37	2.33	2.87	1.98	28.99
6504	Read Phosphate Co., Charleston, S. C.	Read's Paramount Guano	Rockingham	7.66	.35	2.10	2.45	2.98	2.51	30.65
6285	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Delta Tobacco Fertilizer	Hillsboro	8.21	1.75	.77	2.32	3.06	2.32	30.29
6892	do	do	Bethel	8.13	1.86	.81	2.70	3.28	2.06	29.77

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.

MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100						Total Potash	Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia			
Brands claiming											
6896	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Delta Tobacco Fertilizer	Bethel	8.00			2.47	3.00	2.00	\$ 28.37	
6831	do.	do.	Vanceboro.	7.72	1.52	.92	2.44	2.97	2.16	28.77	
6530	do.	do.	Vanceboro.	7.90	1.74	.88	2.62	3.19	1.80	27.90	
6917	do.	do.	Bethel	7.70	1.76	.70	2.46	2.99	1.92	27.63	
6885	do.	do.	Cedar Creek	8.09	1.45	1.10	2.55	3.10	1.76	27.60	
6884	do.	do.	Nashville	8.00	1.16	1.26	2.42	2.91	1.88	27.65	
6849	do.	do.	Walthall	8.34	1.18	1.46	2.64	3.21	1.60	27.43	
7029	do.	do.	Battleboro.	8.06	1.85	.65	2.50	3.01	1.72	27.16	
6260	do.	do.	New Bern.	8.67	.92	1.56	2.48	3.02	1.52	26.69	
6940	Southern Cotton Oil Co., Rocky Mount, N. C.	S. C. O. Co.'s Ammoniated Guano.	Scotland Neck	7.61	1.19	1.25	2.44	2.97	1.02	22.96	
6522	do.	do.	Rockingham	7.33	1.13	1.38	2.51	3.05	1.92	27.47	
6808	do.	do.	Lucama.	7.88	.17	2.10	2.27	2.76	1.74	26.11	
6591	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's C. S. Meal Compound High Grade Guano.	Williamston	7.75	1.26	.34	1.60	1.91	1.92	24.07	
6923	do.	Swift's Gold Leaf Tobacco Grower High Grade Guano.	Creedmoor	7.00	.98	1.36	2.34	2.81	1.82	25.93	
6676	do.	do.	Henderson	7.90	.37	2.20	2.57	3.12	2.76	32.49	
6659	do.	do.	Watkins	7.41	.38	2.01	2.42	2.94	2.96	32.37	
6924	do.	do.	Creedmoor	7.76	1.10	1.42	2.52	3.06	2.80	32.34	
				8.21	.27	2.06	2.33	2.83	2.50	30.50	

6742	.....do.....	Stem.....	7.80	1.36	1.16	2.52	3.06	2.41	30.43
6677	.....do.....	Swift's Gold Leaf Tobacco Grower	8.17	1.36	1.12	2.48	3.02	2.06	28.89
6502	.....do.....	Standard Grade Guano.	8.03	1.17	1.21	2.41	2.93	2.11	28.85
6674	.....do.....	.....do.....	8.12	1.12	1.38	2.50	3.01	1.96	28.42
6664	.....do.....	.....do.....	8.13	1.16	1.22	2.38	2.89	2.01	28.33
6657	.....do.....	.....do.....	8.65	.22	2.28	2.50	3.04	1.66	27.45
6656	.....do.....	.....do.....	8.25	.51	2.02	2.56	3.11	1.52	26.60
6675	.....do.....	.....do.....	8.01	.21	1.82	2.06	2.50	1.84	25.86
6590	Tidewater Guano Co., Norfolk, Va.....	Tidewater 3-8-2 Guano.....	8.36	1.41	1.08	2.52	3.06	1.78	27.84
6654	Union Guano Co., Winston-Salem, N. C.....	Union Gold Leaf Tobacco Compound, Revised.....	8.08	2.42	.40	2.82	3.43	1.94	29.62
6379	.....do.....	Victoria H. G. Tobacco Fertilizer, Re- vised.....	9.71	1.69	.41	2.10	2.55	2.16	29.33
6578	.....do.....	.....do.....	9.52	1.71	.84	2.58	3.11	1.74	29.06
6445	.....do.....	.....do.....	10.28	.48	1.61	2.12	2.58	1.86	28.48
6655	.....do.....	.....do.....	7.91	1.96	.32	2.28	2.77	2.16	26.79
6660	.....do.....	.....do.....	8.08	1.46	.78	2.28	2.77	2.08	27.89
6657	.....do.....	.....do.....	8.75	1.62	.70	2.32	2.82	1.84	27.69
6753	Upshur, R. L., Guano Co., Norfolk, Va.....	Upshur's 8-3-2 Guano.....	6.64	1.11	1.10	2.51	3.09	1.70	25.81
6672	Va.-Car. Chemical Co., Richmond, Va.....	Norfolk and Carolina Chemical Co.'s Bright Leaf Tobacco Grower.....	7.38	2.22	.41	2.66	3.23	1.90	28.65
6350	.....do.....	Old Horn Guano Co.'s Farmers' Friend O. D. Special Tob. Fertilizer C. S. M.....	7.33	1.09	1.19	2.58	3.11	2.02	31.27
6751	.....do.....	V. C. C. Co.'s Bright Leaf Tobacco Grower, C. S. M.....	7.78	1.38	1.16	2.51	3.09	2.20	29.45
6426	.....do.....	.....do.....	8.00	1.71	.79	2.50	3.01	1.92	28.10
6686	.....do.....	.....do.....	8.53	1.62	.66	2.28	2.77	1.94	27.81
6425	.....do.....	.....do.....	8.31	1.71	.77	2.48	3.02	1.74	27.46
6527	.....do.....	V. C. C. Co.'s Farmers' Success, Revised	8.11	1.21	1.51	2.78	3.38	2.38	31.09

6653	do	do	Oxford	8.30	1.32	1.30	2.62	3.19	2.60	32.30
6652	do	do	Oxford	8.16	1.26	1.28	2.51	3.09	2.50	31.31
6653	do	do	Oxford	8.11	2.26	1.20	2.46	2.99	2.70	31.94
6427	do	do	Oxford	8.33	1.11	1.33	2.45	2.97	2.50	31.08
6637	do	do	Oxford	9.51	1.24	1.20	2.44	2.97	3.00	31.76
6626	do	do	Oxford	8.08	.50	1.88	2.44	2.97	2.73	32.23
6698	do	do	Oxford	8.00	1.22	1.45	2.70	3.28	2.20	30.94
6630	do	do	Oxford	8.40	.61	2.04	2.68	3.26	2.76	33.46
6632	do	do	Oxford	8.60	1.15	1.30	2.48	3.02	3.24	35.22
6629	do	do	Oxford	8.25	1.21	1.30	2.51	3.09	2.98	33.82
6379	do	do	Oxford	8.13	1.31	1.26	2.57	3.12	2.10	29.42
6631	do	do	Oxford	8.64	1.38	1.28	2.66	3.23	3.20	35.81
6687	do	do	Oxford	8.01	2.13	1.00	3.17	3.81	3.02	36.26
6399	do	do	Benson	7.93	1.45	1.22	2.67	3.25	2.50	31.69
6735	do	do	Elizabeth City	7.26	1.10	1.00	2.10	2.55	2.92	30.68
Brands claiming										
6975	Farmers Cotton Oil Co., Wilson, N. C.	Carolina Choice	Kenly	9.73	.82	1.75	2.60	3.16	.66	23.95
6840	Farmville Oil and Fertilizer Co., Farmville, N. C.	Special for Tobacco	Farmville	8.18	1.18	2.00	3.18	3.87	.32	23.41
Brands claiming										
6334	American Fertilizer Co., Norfolk, Va.	American Sweet Potato Guano	Elizabeth City	7.21	3.09	.41	3.50	1.26	1.40	28.91
6813	do	N. C. and S. C. Cotton Grower	Hildebrand	9.25	2.52	.50	3.02	3.67	.92	26.53
6693	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Caraleigh 8-4-1	Williamston	8.41	.64	2.86	3.50	1.26	1.94	32.81
6976	Farmers Gunno Co., Raleigh, N. C.	F. G. Co.'s 8-4-1	Laurana	8.26	.51	2.72	3.26	3.96	.92	26.55
6739	Miller Fertilizer Co., Baltimore, Md.	Miller's Special Fertilizer	Elizabeth City	7.81	2.78	.48	3.24	3.41	1.06	26.72
6861	Powhatan Chemical Co., Richmond, Va.	North State Cotton Special	Battleboro	7.40	2.98	.62	3.60	1.38	1.22	28.62

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100						Relative Value per Ton at Factory
				Available Phosphoric Acid	Water Soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	
Brands claiming				8.00			3.29	4.00	2.00	\$ 31.82
6354	Meadows, E. H. & J. A., Co., New Bern, N. C.	Meadows' Ideal Compound	New Bern	6.87	.97	2.37	3.34	1.06	3.56	38.70
6371	Navassa Guano Co., Wilmington, N. C.	Coree Tobacco Guano Revised	Fayetteville	8.30	2.41	.91	3.38	4.11	1.78	31.40
6314	do.	Navassa Special Truck Guano	Council	9.09	1.72	.72	2.44	2.97	2.00	29.32
6264	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Excellior Tobacco Grower	New Bern	8.83	1.25	2.03	3.28	3.99	2.30	31.11
6371	do.	do.	Fort Barnwell	8.83	.86	2.04	2.90	3.53	1.22	27.11
6309	Pamlico Chemical Co., Washington, N. C.	Pamlico Royal Tobacco Grower	Washington	8.16	2.48	.80	3.28	3.99	1.70	30.44
Brands claiming				8.00			3.29	4.00	3.00	36.82
6743	Upshur, R. L., Guano Co., Norfolk, Va.	Upshur's Trade Mark 8-4-3 Special	Powell's Point	8.03	2.28	.98	3.26	3.96	2.80	35.72
6745	Swift & Co., Fertilizer Works, Atlanta, Ga.	Swift's Market Garden Manure, High Grade Guano	Riddle	7.11	1.30	1.64	2.94	3.57	2.66	32.76
Brands claiming				8.00			4.11	5.00	1.00	30.30
6359	Baugh & Sons Co., Norfolk, Va.	Baugh's Peruvian Guano	Elizabeth City	8.06	3.29	.93	4.22	5.13	1.00	30.78
6415	Farmers Guano Co., Raleigh, N. C.	F. G. Co.'s 8-5-1	Water Lily	7.21	3.25	.67	3.92	4.77	1.06	28.97
6736	Martin Fertilizer Co., Philadelphia, Pa.	Martin Abattoir Products 8-5-1	Elizabeth City	9.26	2.58	.90	3.48	4.23	.94	28.58
6352	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Gadie Truck Compound	Elizabeth City	8.06	2.89	1.23	4.12	5.01	1.16	31.16
6294	Upshur, R. L., Guano Co., Norfolk, Va.	Upshur's Trade Mark for All Crops 8-5-1 Special	Columbia	7.70	3.37	.71	4.08	4.96	1.10	30.34
Brand claiming				8.00			4.11	5.00	2.00	35.26
6750	Carolina Union Fertilizer Co., Norfolk, Va.	Carolina Union 8-8-2	Poplar Branch	7.91	2.48	1.26	3.74	4.55	1.90	33.12

Brands claiming		8.00	4.11	5.00	3.00	40.26		
6336	Armour Fertilizer Works, Baltimore, Md.	7.85	3.09	1.23	4.32	5.25	3.22	42.09
6684	Upshur, R. L., Guano Co., Norfolk, Va.	8.52	2.94	.98	3.92	1.77	2.04	35.18
Brand claiming		8.50			1.65	2.00	1.50	22.93
6730	American Fertilizer Co., Norfolk, Va.	9.41	.38	1.56	1.91	2.36	1.38	21.46
Brand claiming		9.00			.82	1.00	2.00	22.41
6551	Swift & Co. Fertilizer Works, Atlanta, Ga.	8.78	.12	.90	1.02	1.21	2.06	21.36
Brand claiming		9.00			.82	1.00	3.00	27.41
6447	Swift & Co. Fertilizer Works, Atlanta, Ga.	9.20	.33	.68	1.01	1.23	3.00	28.44
Brands claiming		9.00			1.65	2.00	1.00	20.93
6853	American Agricultural Chemical Co., New York, N. Y.	9.70	.64	1.10	1.71	2.11	.92	21.61
6721	do.	9.64	1.28	.46	1.71	2.11	.90	21.15
6416	American Fertilizer Co., Norfolk, Va.	8.34	1.67	.29	1.96	2.38	2.26	27.87
6695	do.	9.97	1.16	.62	1.58	2.16	.92	22.05
6322	Armour Fertilizer Works, Greensboro, N. C.	9.21	.75	.75	1.50	1.82	1.02	20.61
6710	do.	8.07	.68	.91	1.62	1.97	.94	19.57
6651	Asheville Packing Co., Asheville, N. C.	8.63	1.00	.98	1.98	2.41	1.06	22.25
6779	Atlantic Chemical Co., Norfolk, Va.	8.54	.82	.78	1.60	1.91	1.00	20.26
6541	Baugh & Sons Co., Norfolk, Va.	8.35	.78	.76	1.54	1.87	1.28	21.22
6667	do.	8.63	.80	.76	1.56	1.89	1.16	21.08
6769	Brown, H. P., Guano Co., Salisbury, N. C.	7.23	.62	1.36	1.98	2.41	1.61	27.75
6549	Bryant Fertilizer Co., Alexandria, Va.	10.05	.88	.82	1.70	2.07	.98	22.09
6823	Coe-Mortimer Co., Charleston, S. C.	8.65	1.02	.52	1.54	1.87	.98	20.02
6841	Clayton Oil Mill, Clayton, N. C.	8.88	.60	1.28	1.88	2.24	.94	21.48
6806	Georgia Chemical Works, Augusta, Ga.	9.57	1.00	.54	1.54	1.87	1.01	21.21

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.

MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition of Parts per 100					Total Potash	Relative Value per Ton at Factory
				Available Phosphoric Acid	Water Soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		
Brands claiming										
6805	Lister's Agricultural Chemical Works, New York, N. Y.	Lister's Standard Pure Superphosphate of Lime	Siler City	9.91	1.26	.45	1.71	2.11	.80	21.25
6705	Marietta Fertilizer Co., Greensboro, N. C.	Marietta Fertilizer 9-2-1	Oxford	8.90	.92	.76	1.68	2.04	.96	20.76
6287	Martin Fertilizer Co., Norfolk, Va.	Martin's Nine-Two-One	Haw River	9.40	1.03	1.13	2.16	2.63	.86	22.77
6772	Miller Fertilizer Co., Baltimore, Md.	Miller's Acme	Roxboro	9.88	1.26	.48	1.71	2.11	1.06	22.19
6804	Navassa Guano Co., Wilmington, N. C.	Navassa Ammoniated Fertilizer	Rockwell	9.07	1.01	.69	1.64	1.99	1.70	21.46
6382	Norfolk Fertilizing Co., Norfolk, Va.	Oriana 2-9-1 Fertilizer	Monroe	9.50	1.25	.83	2.08	2.53	1.20	21.21
6714	do.	do.	Mount Airy	8.41	1.18	.66	1.84	2.21	.96	20.94
6737	N. C. Farmers' Union, Statesville, N. C.	N. C. Farmers' Union 9-2-1 Guano	Statesville	10.53	1.28	.56	1.81	2.21	1.06	23.56
6803	Old Buck Guano Co., Richmond, Va.	Old Buck Minorca Guano	Siler City	8.03	.68	1.91	1.72	2.69	1.08	20.65
6850	Patapasco Guano Co., Baltimore, Md.	Patapasco General Crop Producer	Durham	8.93	1.04	.86	1.90	2.31	1.06	22.21
6764	Pocomoke Guano Co., Norfolk, Va.	Pocomoke Fertilizer	Stony Point	9.01	1.20	.68	1.88	2.29	.90	21.41
6244	do.	Pocomoke 2-9-1 Fertilizer	Waxhaw	8.96	1.29	.35	1.64	1.99	2.08	26.25
6505	do.	do.	Stanfield	9.99	1.46	.50	1.96	2.31	.84	22.42
6548	Powhatan Chemical Co., Richmond, Va.	Magie Cotton Special	Goldston	9.06	.52	1.24	1.76	2.11	.98	21.35
6713	Reidsville Fertilizer Co., Reidsville, N. C.	Reidsville Big Crop Guano	Mount Airy	8.66	1.10	.24	1.34	1.63	.72	17.89
6592	Richmond Guano Co., Richmond, Va.	Premium Cotton Special	Selwin	8.78	1.38	.46	1.84	2.24	1.02	21.02

6424	.....do.....	Davidson.....	9.29	1.23	.42	1.65	2.00	.90	20.72
6522	.....do.....	Premium Tobacco Special.....	9.03	1.30	.50	1.80	2.19	.92	21.19
6661	.....do.....	Walnut Cove.....	9.35	1.50	.46	1.76	2.14	.83	21.14
6224	Royster, F. S., Guano Co., Norfolk, Va.....	Royster's Honey Bee Special Compound.....	9.30	1.55	.89	2.44	2.97	2.08	29.95
6648	.....do.....	Saluda.....	9.16	.84	.80	1.64	1.99	.92	20.65
6908	Southern Cotton Oil Co., Wilson, N. C.....	S. C. Oil Co. Ammoniated.....	8.27	.34	1.28	1.62	1.97	1.16	20.81
7003	Swift & Co. Fertilizer Works, Atlanta, Ga.....	Swift's Cotton Plant Standard Grade Guano.....	8.58	.78	1.52	2.30	2.89	.96	23.04
6419	.....do.....	Marshville.....	7.50	.43	1.22	1.65	2.01	.78	18.33
6756	Tennessee Chemical Co., Greensboro, N. C.....	Ox Fertilizer 9-2-4.....	8.10	.62	.98	1.60	1.91	.98	19.72
6775	Tuscarora Fertilizer Co., Greensboro, N. C.....	Tuscarora Fertilizer, No. 921.....	8.15	.72	1.06	1.78	2.16	1.08	21.03
6431	Va.-Car. Chemical Co., Richmond, Va.....	Allison & Addison's Anchor Brand Guano.....	9.44	1.45	.41	1.89	2.30	1.44	23.08
6319	.....do.....	Allison & Addison's Star Brand Guano.....	9.55	.91	.43	1.34	1.63	1.14	20.83
6377	.....do.....	Durham.....	9.86	1.11	.72	1.87	2.22	.96	22.15
6763	.....do.....	Va. State Fertilizer, Highland King.....	8.36	1.44	.62	2.06	2.50	.86	21.31
6575	Venable Fertilizer Co., Richmond, Va.....	Planters' Bone Special.....	8.95	1.34	.46	1.80	2.19	.74	20.21
	Brand claiming.....	Kings Mountain.....	9.00	.....	.....	1.65	2.00	2.00	25.93
6406	Patapsco Guano Co., Baltimore, Md.....	Patapsco Bright Tobacco Grower.....	9.56	1.45	.91	2.36	2.87	1.46	26.57
	Brands claiming.....	Walnut Cove.....	9.60	.....	.....	1.85	2.25	2.00	26.77
7049	Pocomoke Guano Co., Norfolk, Va.....	Pocomoke Fertilizer.....	10.47	1.20	.68	1.88	2.29	2.10	28.87
6837	.....do.....	Snow Hill.....	8.55	.78	1.16	1.91	2.36	1.90	26.20
	Brands claiming.....	.....	9.00	.....	.....	2.06	2.50	1.00	22.65
6378	Armour Fertilizer Works, Greensboro, N. C.....	Armour's No. 9-2-4 Fertilizer.....	9.10	1.35	.77	2.12	2.58	1.06	24.30
6826	Swift & Co. Fertilizer Works, Atlanta, Ga.....	Swift's Special Ammoniated Guano.....	8.24	.72	1.46	2.18	2.65	.52	20.00
	Brands claiming.....	.....	9.00	.....	.....	2.06	2.50	2.00	27.65
6571	Baugh & Sons Co., Norfolk, Va.....	Baugh's Colonial Tobacco Guano.....	8.96	1.31	.58	1.92	2.33	2.04	27.22
6933	.....do.....	.....	8.66	1.27	.72	1.99	2.44	1.96	26.82

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916. MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-Soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		Total Potash
Brand claiming										
6906	Union Seed and Fertilizer Co., Raleigh, N. C.	Union Seed and Fertilizer Co.'s Brand No. 3.	Lucama	9.00	.92	1.56	2.48	3.02	.56	\$ 21.03
Brands claiming										
6525	Bryant Fertilizer Co., Alexandria, Va.	Bryant's Special Cotton-seed Meal Fertilizer	Robersonville	9.35	.77	1.26	2.03	2.17	1.88	27.28
6817	Columbia Guano Co., Norfolk, Va.	Columbia Argo Tobacco Fertilizer	Wilson	8.73	.66	1.61	2.39	2.80	2.08	28.79
6831	do.	do.	Wilson	9.11	1.00	1.30	2.30	2.80	1.84	27.97
6558	Coöperative Warehouse Co., Salisbury, N. C.	Farmers' Union 9-23-2 Guano, Standard Grade.	Wilson	7.98	.92	.91	1.86	2.26	2.08	26.19
6439	do.	Farmers' Union 9-23-2 Tobacco Guano Standard Grade.	Nashville	8.95	1.21	1.25	2.46	2.49	1.54	26.98
6818	Navassa Guano Co., Wilmington, N. C.	Navassa Manipulated Guano.	Everetts	9.23	1.92	.38	2.30	2.80	2.24	30.09
6688	Old Buck Guano Co., Richmond, Va.	Old Buck Advanced Tobacco Meal Body.	Williamston	9.16	.81	1.46	2.30	2.80	2.00	28.82
7048	Patapsco Guano Co., Baltimore, Md.	Patapsco 9-23-2 Gold Leaf C. S. M. Mixture, 1916.	Elm City	9.64	1.58	.90	2.48	3.02	2.10	30.56
6962	Rasin-Monumental Co., Baltimore, Md.	Rasin's Dixie Tobacco Guano.	Nashville	8.65	1.32	1.70	3.02	3.67	2.06	31.63
6433	do.	do.	Nashville	9.52	1.51	.41	1.92	2.33	2.00	27.58
6521	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Meal Mixture.	Williamston	7.55	1.43	1.58	3.01	3.66	1.96	29.99
7043	Union Guano Co., Winston-Salem, N. C.	Farmers' Union 9-23-2	Elm City	9.01	1.06	1.40	2.46	2.99	2.16	30.14
7044	do.	do.	Elm City	9.72	.86	1.24	2.10	2.55	2.12	29.11
7045	do.	do.	Elm City	9.49	.88	1.34	2.22	2.70	2.04	29.01

6376	Va.-Cur. Chemical Co., Richmond, Va.	Allison & Addison's Star Brand Tobacco	Durham	10.31	1.09	.42	1.51	1.84	2.18	27.55
6469	do	Maure	Nashville	9.02	1.66	1.11	2.80	3.40	1.80	29.75
6877	do	V.-C. C. Co.'s Prolific Cotton Grower	Nashville	10.02	.96	1.50	2.46	2.99	1.84	29.55
6586	do	do	Williamston	8.78	1.01	1.24	2.28	2.99	1.94	28.06
6776	do	do	Kenly	9.51	1.02	1.30	2.32	2.82	1.80	28.25
6443	do	do	Nashville	10.60	1.18	1.12	2.30	2.80	2.34	31.96
6520	do	V.-C. C. Co.'s White Stem C. S. M.	Williamston	9.55	1.33	.98	2.31	2.81	1.94	28.45
Brand claiming										
6149	American Agricultural Chemical Co., Charleston, S. C.	Sea Fowl Guano	Johns	9.22	1.22	1.27	2.49	3.03	1.98	21.62
Brands claiming										
6510	Union Seed and Fertilizer Co., Wilmington, N. C.	U. S. and F. Co.'s Brand, No. 4	Parkton	9.17	1.22	1.74	2.96	3.60	.74	25.30
6511	do	do	Parkton	9.26	1.06	1.66	2.72	3.31	.60	23.68
6576	do	do	Lumberton	9.43	1.08	1.52	2.60	3.16	.74	23.55
Brands claiming										
6385	Baugh & Sons Co., Norfolk, Va.	Baugh's Grand Rapid High Grade-Guano	Oxford	9.27	1.51	.96	2.47	3.00	.92	24.24
6786	Farmers Guano Co., Raleigh, N. C.	F. G. C. 9-3-1 Guano	Williamston	8.37	.90	1.74	2.61	3.21	.92	25.06
6587	Imperial Company, Norfolk, Va.	Imperial 3-9-1 Fertilizer	Lumberton	9.03	1.52	.86	2.38	2.89	1.20	25.00
6599	do	do	Fayetteville	9.22	1.60	.96	2.56	3.11	.90	24.17
6523	do	do	Williamston	8.35	.91	1.78	2.69	3.27	1.06	24.95
6403	Patapsco Guano Co., Baltimore, Md.	Patapsco 9-3-1 Fertilizer	Benson	9.40	1.83	.76	2.59	3.15	1.08	25.68
6725	Pocahontas Guano Co., Lynchburg, Va.	Pocahontas Guano Co.'s 1916 A1 Brand Fertilizer	Colfax	9.69	1.60	.76	2.36	2.87	1.00	24.60
6272	Read Phosphate Co., Charleston, S. C.	Read's Cotton Flower	Morven	7.67	1.21	1.07	2.28	2.77	.96	22.05
6757	Southern Cotton Oil Co., Shelby, N. C.	S. C. O. Co. Ammoniated	Patterson Springs	8.32	.62	1.80	2.42	2.94	.94	23.18
7002	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Corn and Cotton Fertilizer, High Grade	Kernersville	9.05	1.00	1.18	2.18	3.02	1.12	25.07

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.

MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition of Parts per 100					Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	
Brands claiming									
6744	Upshur, R. L., Guano Co., Norfolk, Va.	Upshur's 9-3-1 Guano.	Poplar Branch.	9.00	1.18	1.12	2.30	2.80	1.06
6341	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Farmers' Choice C. S. M. Revised.	Maxton.	9.28	.97	1.45	2.42	2.91	1.11
6408	do.	do.	Walnut Cove.	10.01	1.79	.41	2.40	2.92	1.42
Brands claiming									
6369	Lister's Agricultural Chemical Co., Newark, N. J.	Lister's Carolina Bright for Tobacco, 1916	Seolina.	9.71	1.62	.86	2.18	3.02	1.94
6548	Patapasco Guano Co., Baltimore, Md.	Patapasco Tobacco Fertilizer.	Cardenas.	9.81	2.02	.78	2.80	3.10	1.84
6438	do.	do.	Pilot Mountain.	10.00	.37	1.98	2.35	2.86	2.18
6390	do.	do.	Lucama.	9.93	1.77	.81	2.58	3.14	2.00
6601	do.	do.	Walnut Cove.	9.61	1.60	.98	2.58	3.11	2.02
6635	do.	do.	Oxford.	8.84	1.90	.58	2.48	3.02	2.12
7006	do.	do.	Pilot Mountain.	9.12	1.51	.92	2.46	2.99	1.98
6657	do.	do.	Oxford.	8.96	1.80	.60	2.40	2.92	2.06
6668	do.	do.	Henderson.	8.85	1.86	.60	2.46	2.99	1.98
6385	Royser, F. S., Guano Co., Norfolk, Va.	Pilot Mountain Special Tobacco Guano, F. S. R.	Pilot Mountain.	9.25	1.83	.77	2.60	3.16	2.04
Brand claiming									
6301	Eastern Cotton Oil Co., Hertford, N. C.	Half-and-Half Cotton-seed Meal and Acid Phosphate.	Columbia.	9.00		2.88	3.50	.80	25.10
				9.10	.21	2.71	2.92	3.55	1.00

Brand claiming									
6362	Va.-Car. Chemical Co., Richmond, Va.	Va.-Car. Chemical Co.'s Prolific Cotton Grower.	Smithfield	10.41	1.45	.99	2.41	2.97	1.72
Brands claiming									
6461	Old Buck Guano Co., Richmond, Va.	Old Buck Advanced Tobacco.	Pilot Mountain.	9.36	1.45	.78	2.23	2.71	2.00
7039	Union Guano Co., Winston-Salem, N. C.	Farmers' Union 9-23 1/2.	Elm City.	10.38	.78	1.26	2.04	2.48	2.00
Brand claiming									
6192	Wilcox-Gibbs Guano Co., Charleston, S. C.	Special 9-25-2-1 Guano.	Morven.	8.65	.65	1.06	1.71	2.08	.94
Brands claiming									
6375	Coe-Mortimer Co., Charleston, S. C.	Coe-Mortimer Co.'s 10-1-1 Fertilizer.	Ellerbe.	9.84	.56	.54	1.10	1.31	1.16
6900	Patapago Guano Co., Baltimore, Md.	Coon Brand Guano, 1916.	Walnut Cove.	9.91	.69	.56	1.16	1.11	1.18
6581	Richmond Guano Co., Richmond, Va.	Premium Brand Grower.	Eaves Siding.	10.34	.66	.21	.90	1.09	.96
6753	Union Guano Co., Winston-Salem, N. C.	Union Special 10-1-1 Ammoniated Mixture	Landale.	10.81	.69	.11	1.04	1.26	1.04
6587	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Special Grain Mixture, Revised.	Jamesville.	9.80	1.28	.32	1.60	1.94	1.10
Brands claiming									
6232	Baugh & Sons Co., Philadelphia, Pa.	Baugh's Complete Animal Base Fertilizer.	Winston.	9.98	.97	.87	1.84	2.24	1.22
6773	Ober, G., & Sons Co., Baltimore, Md.	Ober's Red Indian Tobacco.	Reidsville.	9.74	1.16	.70	1.86	2.26	1.56
6717	do.	Ober's Standard Fish Guano.	Albemarle.	9.95	.82	1.10	1.92	2.33	1.20
Brand claiming									
6408	Panlico Chemical Co., Washington, N. C.	Panlico Necessity Guano.	Richlands.	10.50			2.29	2.78	1.64
Brand claiming									
6650	Asheville Packing Co., Asheville, N. C.	Asheville Packing Co.'s Ideal Wheat and Corn Grower.	Asheville.	9.01	2.08	1.34	3.12	4.16	1.40
Brands claiming									
6460	Nitrate Agencies Co., New York, N. Y.	Pescadorens H. G. Genuine Peruvian Guano.	Fayetteville.	11.53	5.26	6.74	12.00	14.59	2.80
6788	do.	do.	Roseboro.	11.62	7.78	3.64	11.42	13.88	3.29

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.

MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition of Parts per 100						Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-Soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash		
Brand claiming											
6461	Nitrate Agencies Co., New York, N. Y.	Pescadcons H. G. Genuine Peruvian Guano.	Fayetteville	10.00	11.81	7.32	4.28	11.60	14.10	2.66	70.84
6618	do.	do.	Fayetteville		11.20	4.66	6.50	11.16	13.57	2.86	72.37
Brands claiming											
6791	Coöperative Warehouse Co., Salisbury, N. C.	Farmers' Union 11-2-1 Guano, High Grade.	Swannanoa		11.00			1.65	2.00	1.00	\$ 22.93
6237	Union Guano Co., Winston-Salem, N. C.	Union War Cry	Waxhaw		9.82	.76	.64	1.40	1.70	2.02	25.80
					12.35	1.61	.29	1.90	2.31	.52	22.93
Brand claiming											
6500	Carolina Union Fertilizer Co., Norfolk, Va.	Carolina Union 5-7-2	Poplar Branch		7.00			4.11	5.00	2.00	34.26
					7.54	2.82	1.26	4.08	4.96	1.64	32.88
Brand claiming											
6331	Peruvian Guano Corporation, Charleston, S. C.	Peruvian Potato Formula	Elizabeth City		7.00			4.11	5.00	2.00	34.26
					7.40	4.01	.27	4.28	5.20	1.96	35.18
Brands claiming											
6293	New Bern Cotton Oil and Fertilizer Co., New Bern, N. C.	Excelsior Tobacco Grower	New Bern		7.00			4.11	5.00	1.00	29.27
6292	Pocomoke Guano Co., Norfolk, Va.	Pocomoke 5-7-1 Fertilizer	Columbia		7.14	2.05	2.35	4.40	5.35	1.12	31.22
6622	Richmond Guano Co., Richmond, Va.	Rex Truck Special	Selwin		7.19	3.23	.93	4.16	5.06	1.24	30.86
6686	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Exp. 5 Per Cent Potato Guano.	Elizabeth City		7.23	2.20	1.84	4.04	4.91	1.10	29.70
6733	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Early Truck High Grade Guano.	Elizabeth City		6.70	2.56	1.04	3.60	4.38	1.12	27.42
6800	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Konqueror H. G. Truck Fertilizer.	Elizabeth City		6.55	1.14	2.78	3.92	4.74	.96	27.81
					7.03	3.10	.90	4.00	4.86	1.24	30.30

Brands claiming									
6748	Eastern Cotton Oil Co., Hertford, N. C.	Hertford Truck Grower	Elizabeth City	6.03	4.02	1.06	5.08	6.18	1.11
6020	Pocomoke Guano Co., Norfolk, Va.	Pocomoke 7-6-1 Fertilizer	Jarvisburg	7.33	3.56	1.16	5.16	6.27	.88
6734	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Special High Grade Truckee	Elizabeth City	6.80	2.71	2.22	4.96	6.05	1.12
Brands claiming									
6302	Eastern Cotton Oil Co., Hertford, N. C.	Our Surprise Potato Product	Columbia	5.31	1.43	2.13	2.66	1.60	5.00
6357	Grandy, N. G., & Co., Elizabeth City, N. C.	Grandy's 5-6-5 Potato Manure	Elizabeth City	5.65	3.01	2.11	5.12	6.27	4.92
Brands claiming									
6300	Eastern Cotton Oil Co., Hertford, N. C.	Substitute for Non Such Potato Grower	Columbia	6.26	1.59	2.13	4.02	1.80	1.12
6412	N. C. Farmers' Union, Statesville, N. C.	N. C. Farmers' Union Guano	Currituck	6.10	2.69	.85	3.51	4.30	.92
Brand claiming									
6307	Atlantic Chemical Co., Norfolk, Va.	Atlantic Cheshire 7 Per Cent Potato Guano	Columbia	6.08	3.89	1.35	5.44	6.61	1.02
Brand claiming									
6413	N. C. Farmers' Union, Statesville, N. C.	N. C. Farmers' Union Guano	Currituck	6.16	2.19	.61	3.10	3.77	.90
Brand claiming									
6354	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Cannon Brand Truckee, F. S. R.	Elizabeth City	5.00	2.95	1.33	1.28	5.20	1.00
Brands claiming									
7023	Armour Fertilizer Works, Wilmington, N. C.	Armour's Top Dresser	Fayetteville	3.65	4.72	2.51	7.26	8.83	34.14
7017	Tennessee Chemical Co., Wilmington, N. C.	Top Dresser	Norman	3.38	1.76	2.06	7.42	9.12	31.51
7016	Tuscarora Fertilizer Co., Greensboro, N. C.	Tuscarora Top Dresser	Norman	3.40	1.90	2.06	7.56	9.19	35.15
Brands claiming									
6630	Columbia Guano Co., Norfolk, Va.	Columbia Ground Fish Scrap	Seotland Neck	5.12	.68	6.80	7.54	9.17	37.09
6961	Va.-Car. Chemical Co., Richmond, Va.	Va.-C. C. Co.'s 4-10 Top Dresser	Hope Mills	5.50	8.18	.18	8.36	8.95	19.61
Brands claiming									
6486	Pearsall & Co., Wilmington, N. C.	Pearsall's Fish and Meal Mixture	Red Springs	4.27	1.82	1.96	3.73	1.60	20.15
6487	do	Pearsall's Fish and Meal Mixture	Red Springs	4.75	1.96	1.86	3.82	4.61	20.79

6620	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Caraleigh 6-4 Ammoniated Phosphate.....	Fayetteville.....	7.01	1.52	2.22	3.74	4.55	22.72
6576	Conestee Chemical Co., Wilmington, N. C.	Conestee 6-4 Fertilizer.....	Norman.....	5.40	1.72	1.28	3.00	3.65	18.00
6441	Coöperative Warehouse Co., Salisbury, N. C.	Farmers' Union 6-4 Ammoniated Com- pound.....	Nashville.....	6.92	1.51	1.70	3.24	3.94	20.53
6943	.....do.....	.....do.....	Battleboro.....	6.87	.78	2.76	3.51	4.30	21.74
7036	.....do.....	.....do.....	Battleboro.....	8.62	.32	2.70	3.02	3.67	21.30
6491	.....do.....	.....do.....	Red Springs.....	5.58	.56	2.36	2.92	3.55	17.84
6318	Cotton Oil and Fertilizer Co., Rocky Mount, N. C.	Meal and Fish Mixture.....	Whitakers.....	5.33	1.37	1.91	3.28	3.99	19.11
6514	Imperial Company, Norfolk, Va.	Imperial 1-6 Fertilizer.....	Parkton.....	6.35	.70	2.28	2.98	3.62	18.87
6609	Martin Fertilizer Co., Norfolk, Va.	Martin's Ammoniated Compound.....	Dunn.....	6.45	1.44	1.88	3.32	4.04	20.39
6747	.....do.....	.....do.....	Elizabeth City.....	8.13	2.06	.56	2.62	3.19	19.13
6989	.....do.....	.....do.....	Dunn.....	5.99	1.10	1.98	3.08	3.74	18.93
6547	Navassa Guano Co., Wilmington, N. C.	Navassa Ammoniated Superphosphate.....	Fairmont.....	7.86	2.80	.32	3.12	3.79	20.96
6526	Norfolk Fertilizing Co., Norfolk, Va.	Oriana Fertilizer.....	Fayetteville.....	6.31	2.40	.76	3.16	3.81	19.58
6407	Pamlico Chemical Co., Washington, N. C.	Pamlico Fish Compound.....	Maysville.....	5.78	2.41	.82	3.23	3.93	19.35
6568	.....do.....	.....do.....	Hope Mills.....	6.16	2.18	.90	3.08	3.74	19.10
6858	Planters Cotton Oil and Fertilizer Co., Rocky Mount, N. C.	Meal and Fish Mixture, No. 2.....	Battleboro.....	6.05	1.90	2.92	3.32	4.01	19.99
6857	.....do.....	.....do.....	Battleboro.....	5.43	1.06	1.92	2.98	3.62	17.95
6453	Rasin-Monumental Co., Baltimore, Md.	Ammoniated Superphosphate.....	Nashville.....	11.40	.76	1.88	2.64	3.21	22.49
6435	Richmond Guano Co., Richmond, Va.	Edwards' Cotton Grower.....	Nashville.....	5.54	1.57	1.69	3.26	3.96	19.23
6963	.....do.....	Rex Tobacco Guano.....	Nashville.....	6.03	1.62	1.48	3.10	3.77	19.05
6674	Robeson Mfg. Co., Lumberton, N. C.	1916-P.....	Lumberton.....	6.41	.66	2.18	2.84	3.45	18.37
7059	Robertson Fertilizer Co., Norfolk, Va.	Robertson's 4-6 Guano.....	Fayetteville.....	6.53	1.86	1.30	3.16	3.84	19.80
6524	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Flagstaff Ammoniated Phos- phate.....	Hope Mills.....	6.05	2.10	.86	2.96	3.60	18.48
6631	Scotland Neck Guano Co., Scotland Neck, N. C.	Biggs' 6-4 Fish Scrap Guano.....	Whitakers.....	6.01	.20	2.28	2.48	3.02	16.43
6484	Southern Cotton Oil Co., Charlotte, N. C.	S. C. O. Co.'s Ammoniated Compound.....	Red Springs.....	6.96	1.07	2.16	3.23	3.93	20.53
6774	.....do.....	.....do.....	Morven.....	7.93	.86	1.42	2.28	2.77	17.51

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.
MIXED FERTILIZERS.

Inventory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphate	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		Total Potash
Brands claiming									
6846	Southern Cotton Oil Co., Charlotte, N. C.	S. C. O. Co.'s Ammoniated Compound	Morven	6.00			3.29	4.00	\$ 19.82
6546	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Ammoniated Phosphate	Fairmont	5.96	.98	1.20	2.18	2.65	15.12
6980	Tuscarora Fertilizer Co., Wilmington, N. C.	Tuscarora Ammoniated Superphosphate	Stedman	4.89	1.32	1.32	2.64	3.21	15.98
7027	Union Guano Co., Winston-Salem, N. C.	Union Special 6-4 Superphosphate	McFarlan	6.28	.98	2.26	3.21	3.91	19.80
6531	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Ammoniated Compound	Wadesboro	6.41	2.82	.78	3.60	1.38	21.53
6839	do	do	Grifton	5.93	2.63	.82	3.45	1.19	20.47
				6.49	2.52	.72	3.21	3.91	20.10
Brands claiming									
6696	Josey, N. B., Guano Co., Tarboro, N. C.	Biggs' 6-5 Fish Scrap Guano	Tarboro	6.00			4.11	5.00	23.30
6324	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Ammoniated Superphosphate	Elizabeth City	6.52	1.12	2.58	3.80	1.62	22.43
				6.33	4.13	.15	4.28	5.02	24.31
Brand claiming									
6783	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Top Dresser	St. Paul	6.00			8.24	10.02	40.61
				6.38	7.94	.20	8.14	9.90	40.57
Brand claiming									
6351	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Virginia Potato Grower H. G. Guano	Elizabeth City	7.00			4.11	5.00	24.26
				6.80	2.01	2.17	4.18	5.08	24.36
Brand claiming									
6256	Meadows, E. H. & J. A. Co., New Bern, N. C.	Meadows' Cabbage Guano	New Bern	7.00			5.78	7.03	31.28
				7.10	3.03	2.87	5.90	7.17	31.88
Brands claiming									
6633	Baugh & Sons Co., Norfolk, Va.	Baugh's High Grade Tobacco Guano	Whitakers	8.00			2.47	3.00	18.37
				8.31	1.62	.74	2.36	2.87	18.22

6598	Columbia Guano Co., Norfolk, Va.....	Columbia Congress Ammoniated.....	Jamesville.....	8.51	1.72	.80	2.52	3.06	.....	19.09
6836	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.....	Onslow Crop Grower.....	Grafton.....	7.37	1.80	.90	2.70	3.28	.....	18.71
6310	Planters Cotton Oil and Fertilizer Co., Rocky Mount, N. C.....	Meal and Fish Mixture, No. 3.....	Whitakers.....	6.71	1.13	1.59	2.82	3.13	.....	18.55
6392	Swift & Co. Fertilizer Works, Atlanta, Ga.....	Swift's Ammoniated Phosphate, Stand- ard Grade.....	Wadesboro.....	7.43	.51	1.84	2.35	2.86	.....	17.30
7040	Union Guano Co., Winston-Salem, N. C.....	Farmers' Union 8-3.....	Edin City.....	9.15	1.00	1.38	2.38	2.89	.....	19.15
6626	Va.-Car. Chemical Co., Richmond, Va.....	V.-C. C. Co.'s Cotton Ammoniated Com- pound.....	Seotland Neck.....	9.65	2.36	.26	2.62	3.19	.....	20.65
6315	.....do.....	V.-C. C. Co.'s Morgan's Ammoniated Compound.....	Alaskie.....	10.39	2.69	.23	2.92	3.55	.....	22.65
Brands claiming.....										
6492	Acme Mfg. Co., Wilmington, N. C.....	Acme 8-4 Fertilizer.....	Red Springs.....	7.81	2.28	1.36	3.61	1.13	.....	23.10
6353	.....do.....	.....do.....	Raeford.....	8.36	1.95	1.15	3.38	1.11	.....	22.16
6354	.....do.....	.....do.....	Fayetteville.....	8.91	1.63	1.15	3.08	3.71	.....	21.85
6575	.....do.....	.....do.....	Hope Mills.....	7.93	2.24	1.10	3.61	4.13	.....	21.27
7025	.....do.....	.....do.....	Fayetteville.....	8.00	2.20	1.12	3.62	1.10	.....	23.20
6968	.....do.....	.....do.....	Murfreesboro.....	8.10	2.08	1.42	3.70	1.26	.....	22.80
6967	.....do.....	.....do.....	Mullens, S. C.....	7.77	1.94	1.34	3.29	3.99	.....	21.55
6986	Armour Fertilizer Works, Wilmington, N. C., Armour's Ammoniated Superphosphate.....	.....do.....	Stedman.....	8.01	1.52	1.61	3.16	3.84	.....	21.28
6679	.....do.....	.....do.....	Lumberton.....	7.40	1.52	1.71	3.26	3.96	.....	21.09
6720	.....do.....	.....do.....	Indian Trail.....	7.65	1.92	1.20	3.12	3.79	.....	20.75
6632	Baugh & Sons Co., Norfolk, Va.....	Baugh's Nitrophos Soil and Crop Fer- tilizer.....	Whitakers.....	8.58	2.06	1.20	3.26	3.96	.....	23.27
6551	Bryant Fertilizer Co., Alexandria, Va.....	Bryant's High Grade Ammoniated Super- phosphate.....	Rennett.....	9.53	2.82	.26	3.08	3.71	.....	22.17
6548	.....do.....	.....do.....	Fairmont.....	9.43	2.76	.20	2.96	3.60	.....	21.86
6528	.....do.....	.....do.....	Robersonville.....	7.90	2.40	.52	3.12	3.79	.....	21.00
6621	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.....	Caraleigh 8-4 Ammoniated Phosphate.....	Fayetteville.....	8.75	1.58	1.86	3.11	4.18	.....	23.20
6694	Carolina Union Fertilizer Co., Norfolk, Va.....	Carolina Union 4-8.....	Elizabeth City.....	8.76	2.06	1.02	3.08	3.71	.....	21.70
7062	Columbia Guano Co., Norfolk, Va.....	Columbia Big Dipper Ammoniated Phos- phate.....	Dunn.....	8.50	2.34	1.06	3.10	1.13	.....	22.78
6754	.....do.....	.....do.....	Four Oaks.....	7.94	2.38	.96	3.34	4.06	.....	21.97

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		Total Potash
Brands claiming									
6791	Constate Chemical Co., Wilmington, N. C.	Constatee 8-4 Special Fertilizer	White Oak	8.00	1.54	1.72	3.29	4.00	\$ 21.82
6797	do	do	Battleboro	8.20	1.81	1.66	3.50	4.26	22.47
6677	do	do	Lumberton	9.43	1.58	1.06	2.64	3.21	22.90
6559	Contentnea Guano Co., Wilson, N. C.	Climax Special	Bailey	8.01	1.82	1.42	3.24	3.94	20.52
6863	do	do	Battleboro	8.58	1.50	1.82	3.32	4.01	21.62
6393	do	High Grade Cotton Guano	Lucama	7.93	1.61	1.65	3.26	3.60	21.62
6479	Cooperative Warehouse Co., Salisbury, N. C.	Farmers' Union Ammoniated Compound	Wake Forest	13.03	.41	2.18	2.59	3.15	23.91
6944	do	Farmers' Union 8-4	Battleboro	6.58	.60	2.58	3.18	3.87	19.14
6945	do	do	Battleboro	6.35	.14	2.66	2.80	3.40	18.11
6778	Cotton States Fertilizer Works, Chester, S. C.	Cotton States Ammoniated Phosphate	Newton Grove	8.79	.62	2.46	3.08	3.74	21.73
6591	Craven Chemical Co., New Bern, N. C.	C. C. Co.'s Ammoniated 8-4	Hookerton	7.81	2.74	.81	3.60	4.38	22.93
6596	Dixie Guano Co., Suffolk, Va.	Revised Dixie 4-8 Guano	Edenton	7.91	1.64	1.36	3.00	3.65	20.51
6422	Georgia Chemical Co., Augusta, Ga.	Georgia Special	Trenton	7.32	2.25	.89	3.14	3.82	20.51
6790	Imperial Company, Norfolk, Va.	Imperial 1-8 Fertilizer	White Oak	8.12	2.14	.84	2.98	3.62	20.64
6590	do	do	Lumberton	8.28	3.26	1.04	4.30	5.23	26.34
6600	do	do	Fayetteville	8.33	2.02	1.02	3.64	4.43	23.62
6498	do	do	Lillesville	7.93	3.08	.01	3.12	3.79	21.03

6598	do.	do.	Fayetteville	8.52	2.38	.98	3.36	4.09	22.63
6629	Joscy, N. B., Guano Co., Tarboro, N. C.	Joscy's 8-4 Fish Scrap	Scotland Neck	8.58	.56	2.78	3.34	4.06	22.61
6370	do.	do.	Smithfield	6.55	1.04	2.12	3.16	3.84	19.82
6387	Martin Fertilizer Co., Norfolk, Va.	Martin Ammoniated Compound	Smithfield	8.08	2.07	.95	3.02	3.67	20.76
6991	do.	do.	Dunn	9.20	2.22	1.08	3.30	4.01	23.06
6333	do.	do.	Edenton	8.33	2.03	1.39	3.42	4.16	22.69
6536	Meadows, E. H. & J. A., Co., New Bern, N. C.	Meadows' Ideal Special Tobacco	Snow Hill	7.27	1.22	2.40	3.62	4.40	22.48
6338	do.	do.	Chocowinity	7.00	1.86	1.56	3.42	4.16	21.36
6490	McNair Phosphate Co., Laurinburg, N. C.	8-4 Ammoniated Guano	Red Springs	7.68	2.30	1.18	3.48	4.23	22.30
6345	do.	8-4 Ammoniated Phosphate Guano	Maxton	8.45	2.27	1.11	3.38	4.11	22.65
6738	Miller Fertilizer Co., Baltimore, Md.	Miller's Ammoniated Bone Phosphate	Elizabeth City	10.40	2.34	.56	2.90	3.53	22.58
6557	do.	do.	Lilesville	8.26	2.58	.54	3.12	3.79	21.36
6757	Navassa Guano Co., Wilmington, N. C.	Navassa H. G. Ammoniated Superphosphate	Wilmington	8.61	2.48	.78	3.26	3.96	22.30
6585	do.	do.	Lamberton	7.86	2.38	.74	3.12	3.79	20.96
7061	Norfolk Fertilizing Co., Norfolk, Va.	Oriana 8-4 Fertilizer	Fayetteville	8.35	2.26	.86	3.12	3.79	21.45
6525	do.	do.	Fayetteville	8.30	2.16	.80	2.96	3.60	20.73
6553	Pandico Chemical Co., Washington, N. C.	Pandico Acid Fish Mixture	Gritton	8.40	2.54	1.14	3.68	4.47	23.86
6551	do.	do.	Gritton	7.78	2.20	1.28	3.48	4.23	22.40
6982	do.	do.	Vander	8.18	2.04	1.22	3.26	3.96	21.87
6594	do.	do.	Plymouth	7.91	1.96	1.32	3.28	3.99	21.69
6488	do.	do.	LaGrange	7.46	1.97	1.14	3.11	3.78	20.52
6485	Palmetto Guano Corporation, Columbia, S. C.	Palmetto Ammoniated Superphosphate	Morven	7.76	2.27	.72	2.99	3.64	20.32
6401	Peruvian Guano Corporation, Charleston, S. C.	Peruvian Cotton Formula	Fairmont	8.45	2.67	.43	3.10	3.77	21.47
6502	Pocomoke Guano Co., Norfolk, Va.	4-8 Fertilizer	Matthews	8.32	2.48	1.06	3.54	4.30	23.19

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916. MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Total Potash	Relative Value per Ton at Factory
				Available Phosphoric Acid	Water Soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		
Brands claiming										
6522	Powhatan Chemical Co., Richmond, Va.	North State Guano.	Wilson	8.00	2.49	1.00	3.40	4.13	---	\$ 21.82
6816	do	do	Robersonville	8.08	1.26	1.92	3.18	3.87	---	22.36
6532	Read Phosphate Co., Charleston, S. C.	Read's Blood and Bone Mixture	Wadesboro	8.48	2.06	1.16	3.22	3.91	---	21.81
6544	Robeson Mfg. Co., Lumberton, N. C.	1916-A.	Lumberton	8.15	1.74	1.40	3.14	3.82	---	21.67
6512	do	do	Lumber Bridge	8.03	1.82	1.40	3.22	3.91	---	21.22
6769	do	do	Lumberton	7.86	1.78	1.42	3.20	3.89	---	21.38
6895	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Defender Ammoniated Phosphate.	Bethel	7.63	2.60	.88	3.48	4.23	---	21.07
7030	do	do	Battleboro	8.45	1.92	1.44	3.36	4.09	---	23.07
6946	do	do	Bethel	8.18	2.04	1.12	3.16	3.84	---	22.29
6941	do	do	Battleboro	8.89	1.79	1.42	3.21	3.90	---	22.16
6259	do	do	New Bern	7.77	2.11	.99	3.10	3.77	---	21.25
6327	do	do	Edenton	7.51	2.41	.60	3.06	3.72	---	20.53
6838	Scotland Neck Guano Co., Scotland Neck, N. C.	Fish Scrap Guano.	Hobgood	7.27	.42	2.74	3.16	3.84	---	20.12
6845	Southern Cotton Oil Co., Charlotte, N. C.	S. C. O. Co.'s Ammoniated Compound.	Morven	9.38	1.80	1.30	3.10	3.77	---	22.65
6592	Southern Cotton Oil Co., Fayetteville, N. C.	do	Fayetteville	7.96	1.12	2.30	3.42	4.16	---	20.98
6565	do	do	Hope Mills	8.53	1.38	2.10	3.48	4.23	---	22.89
6566	do	do	Hope Mills	7.95	1.22	2.10	3.32	4.04	---	22.57
				7.66	1.22	2.10	3.32	4.04	---	21.60

6564	do.	do.	Hope Mills.	8.12	1.46	1.50	2.96	3.60	20.55
6880	do.	do.	Cedar Creek	7.63	1.99	1.71	3.61	4.43	22.92
6879	do.	do.	Cedar Creek	7.78	1.72	1.62	3.31	4.06	21.81
6981	do.	do.	Vander.	7.77	1.70	1.61	3.31	4.06	21.80
6784	do.	do.	White Oak	7.63	1.90	1.40	3.30	4.01	21.49
7022	do.	do.	Fayetteville	7.03	1.82	1.52	3.24	4.06	21.06
6785	do.	do.	White Oak	7.81	1.70	1.40	3.10	3.77	20.83
6882	do.	do.	Cedar Creek	7.28	2.01	1.21	3.21	3.90	20.75
6016	do.	do.	Fayetteville	7.87	1.14	1.56	2.70	3.28	19.21
6527	Southern Cotton Oil Co., Rocky Mount, N. C.	do.	Robersonville	7.90	.43	2.22	2.65	3.22	19.03
6483	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Ammoniated Phosphate.	Red Springs	7.37	.77	2.01	2.81	3.12	19.17
7053	do.	do.	Fayetteville	7.63	1.51	1.88	3.12	4.16	21.99
6472	do.	do.	Elkin	8.83	.33	2.68	3.01	3.66	21.47
6503	do.	do.	Rockingham	7.78	.49	2.72	3.18	3.87	21.14
6732	do.	Swift's Special Formula A Standard Grade Animal Matter.	Elizabeth City	7.10	.62	2.12	2.74	3.33	18.61
6553	Union Guano Co., Winston-Salem, N. C.	Union Special 8-4 Superphosphate.	Lilbville	9.56	2.08	.64	2.72	3.31	20.98
6579	do.	Union Special 8-1 Superphosphate.	Maxton	7.53	2.34	.54	3.08	3.74	20.47
7046	do.	do.	Wilson	9.01	1.96	.71	2.70	3.28	20.38
6361	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Bone and Fish Ammoni- ated Compound.	Selma	8.17	2.11	.99	3.10	3.77	21.19
6939	do.	do.	Scotland Neck	8.18	1.60	1.15	3.05	3.71	21.70
6293	do.	V.-C. C. Co.'s Quickstep Ammoniated Compound.	Washington	8.50	2.95	.25	3.20	3.89	21.94
6653	do.	do.	Kinston	7.98	2.41	.78	3.22	3.91	21.50
6867	do.	do.	Grifton	8.11	2.98	.32	3.30	4.01	22.27
6424	do.	do.	Trenton	8.31	2.11	.77	3.18	3.87	21.67
6562	do.	V.-C. C. Co.'s 8-4 Ammoniated Super- phosphate.	Hope Mills	8.13	2.56	.68	3.24	3.91	21.74

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphate	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		Total Potash
Brands claiming									
6300	Baugh & Sons Co., Norfolk, Va.	Baugh's A. M. M. Phosphate Soil and Crop Fertilizer.	Elizabeth City.	8.00	3.39	.99	4.11	5.00	\$ 25.26
6414	Farmers Guano Co., Norfolk, Va.	F. G. C. Ammoniated Phosphate.	Water Lily.	7.66	3.39	.99	4.38	5.33	26.06
6667	Josey, N. B., Guano Co., Tarboro, N. C.	Josey's S-5 Fish Scrap Guano.	Hobgood.	8.04	2.95	1.05	4.00	4.86	24.84
6618	Martin Fertilizer Co., Norfolk, Va.	Martin's Ammoniated Phosphate.	Corapeake.	7.24	1.32	3.36	4.68	5.69	26.90
6416	Meadows, E. H. & J. A., Co., New Bern, N. C.	Meadows' Lobos Compound.	New Bern.	8.33	1.81	1.62	3.46	4.21	22.86
6619	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Piedmont Challenge Fertilizer.	Hobbsville.	8.02	1.53	2.40	3.99	4.85	24.78
6621	Pocomoke Guano Co., Norfolk, Va.	Pocomoke 5-8 Fertilizer.	Tutts.	7.70	1.74	2.36	4.10	4.98	24.92
6328	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Apollo Special Trucker.	Elizabeth City.	7.38	2.66	1.14	3.80	4.62	23.34
6681	Upshur, R. L., Guano Co., Norfolk, Va.	Upshur's for All Crop 8-5 Ammoniated.	Elizabeth City.	8.20	2.99	1.15	4.14	5.08	25.59
6957	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Bone and Fish Ammoniated Compound.	Hope Mills.	7.68	1.91	1.86	3.80	4.62	23.64
Brand claiming									
6751	Baugh & Sons Co., Norfolk, Va.	Baugh's Norfolk Special Guano.	Powell's Point.	8.00			5.76	7.00	32.19
Brand claiming									
6782	Peruvian Guano Corporation, Charleston, S. C.	Peruvian High Grade Top Dresser.	Jamesville.	8.01	4.82	1.06	5.88	7.15	32.71
Brand claiming									
6582	Atlantic Chemical Co., Norfolk, Va.	Atlantic Special Guano.	Eaves Siding.	8.00			7.00	8.51	37.40
				7.48	6.32	.56	6.88	8.36	36.38
				9.00			1.65	2.00	15.93
				8.58	.66	1.06	1.72	2.09	15.80

Brands claiming.....		9.00	2.47	3.00	19.37
6518	Acme Mfg. Co., Wilmington, N. C.....	Acme 9-3 Fertilizer.....	Lumber Bridge...	8.42 1.52 1.36 2.88 3.50	20.52
6367	.....do.....	.....do.....	Dunn.....	9.72 1.47 1.09 2.56 3.11	20.47
6793	.....do.....	.....do.....	St. Paul.....	8.56 1.32 1.38 2.70 3.28	19.90
7054	.....do.....	Acme 9-3 Special Fertilizer.....	Wakulla.....	9.24 1.28 1.58 2.86 3.48	21.25
6614	American Agricultural Chemical Co., New York, N. Y.....	3-9-0 Fertilizer.....	Robersonville.....	9.21 1.70 .74 2.44 2.97	19.46
6636	American Fertilizing Co., Norfolk, Va.....	9-3 Ammoniated Compound.....	Henderson.....	9.61 1.50 .86 2.36 2.87	19.55
6395	.....do.....	.....do.....	Wadsworth.....	7.78 1.91 .92 2.83 3.41	19.67
6498	Armour Fertilizer Works, Wilmington, N. C....	Armour's Ammoniated Superphosphate.....	Fayetteville.....	8.91 1.32 1.68 3.00 3.65	21.51
6678	.....do.....	.....do.....	Lumberton.....	8.96 1.06 1.52 2.58 3.14	19.80
7021	.....do.....	.....do.....	Fayetteville.....	8.50 1.32 1.46 2.78 3.38	20.18
6335	Arps, Geo. L., & Co., Norfolk, Va.....	Arps' Acid Phosphate-Ammonia Mixture.....	Elizabeth City.....	9.10 1.87 .73 2.60 3.16	20.02
6820	Barton, C. J., Guano Co., Baltimore, Md.....	Barton's Ammoniated Phosphate.....	Everetts.....	8.85 1.86 .56 2.36 2.87	18.76
6370	Carabigh Phosphate and Fertilizer Works, Raleigh, N. C.....	Carabigh Ammoniated Phosphate.....	Dunn.....	9.81 1.17 1.67 2.84 3.45	21.74
6405	.....do.....	.....do.....	Farmont.....	10.28 .93 1.19 2.42 2.91	20.41
6850	Chatham Oil and Fertilizer Mills, Pittsboro, N. C.....	Chatham Oil and Fertilizer.....	Goldston.....	9.61 .50 1.81 2.34 2.81	19.41
6771	Conestee Chemical Co., Wilmington, N. C....	Conestee 9-3 Fertilizer.....	Lumberton.....	8.80 1.26 1.16 2.42 2.94	18.96
6965	.....do.....	.....do.....	Lumberton.....	9.20 1.50 1.30 2.80 3.40	20.96
6676	.....do.....	.....do.....	Lumberton.....	9.09 1.10 1.22 2.62 3.19	20.09
6391	Contentnea Guano Co., Wilson, N. C.....	Special Cotton Grover.....	Lumberton.....	8.97 1.37 1.23 2.60 3.16	19.89
6561	Coe-Mortimer Co., Charleston, S. C.....	Coe-Mortimer Co.'s 9-3 Fertilizer.....	Lumberton.....	9.56 1.78 .62 2.40 2.92	19.61
6985	Coöperative Warehouse Co., Salisbury, N. C., Farmers' Union 9-3 Ammoniated Compound.....	Cotton States 9-3 Ammoniated Phosphate.....	Newton Grove.....	9.17 .26 2.68 2.94 3.57	21.52
7038	Craven Chemical Co., New Bern, N. C.....	Craven Chemical Co.'s Ammoniated Compound, 930.....	Battleboro.....	9.47 1.52 .99 2.48 3.02	20.09
6622	.....do.....	.....do.....	Fayetteville.....	8.41 1.38 1.08 2.46 2.99	18.75
6499	.....do.....	.....do.....	Monroe.....	7.66 1.67 .92 2.50 3.15	18.54

6788	do.....do.....	White Oak.....	9.18	1.64	.78	2.42	2.94	19.34
6817	do.....do.....	Everetts.....	9.06	1.92	.74	2.66	3.23	20.23
6886	do.....do.....	Lamberton.....	9.57	1.72	.70	2.42	2.91	19.51
6815	do.....do.....	Chadbourne.....	10.15	1.86	.32	2.18	2.65	19.29
6411	do.....do.....	Maysville.....	9.65	1.53	.80	2.33	2.83	18.81
6534	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Onslow Crop Grower.....	8.81	.98	1.90	2.88	3.50	20.91
6426	Palmetto Guano Corporation, Columbia, S. C.	Palmetto Ammoniated Superphosphate.....	9.29	1.87	.62	2.19	3.03	19.75
6496	do.....do.....	do.....	8.65	1.69	.68	2.37	2.88	18.60
6487	Pamlico Chemical Co., Washington, N. C.	Pamlico Rank Guano.....	8.53	1.73	.66	2.39	2.91	18.57
6610	do.....do.....	Washington.....	8.26	1.62	.70	2.32	2.82	18.00
6759	Patapsco Guano Co., Baltimore, Md.	Patapsco 9-3.....	8.93	1.88	.80	2.68	3.26	20.19
6781	Peruvian Guano Corporation, Charleston, S. C.	Peruvian Special Ammoniated Super- phosphate.....	7.82	1.40	1.16	2.56	3.11	18.57
6781	Piedmont-Mount Airy Guano Co., Bal- timore, Md.	Piedmont Cotton Grower.....	8.74	1.26	1.36	2.62	3.19	19.71
6812	Pine Level Oil Mill Co., Pine Level, N. C.	Oasis Guano.....	9.15	1.16	1.26	2.42	2.91	19.31
6466	Planters Cotton Oil Co., Rocky Mount, N. C.	Fish Scrap, No. 3.....	7.62	.64	1.71	2.36	2.89	17.62
6825	Planters Fertilizer and Phosphate Co., Charleston, S. C.	Planters' Special Mixture.....	8.86	.66	1.92	2.58	3.11	19.72
6999	Rasin-Monumental Co., Baltimore, Md.	Rasin Universal Baltimore Ammoniated Phosphate.....	9.90	1.90	.88	2.78	3.38	21.58
6122	do.....do.....	Mooreville.....	10.08	1.89	.74	2.63	3.20	21.13
6485	do.....do.....	Kinston.....	8.41	1.97	.76	2.73	3.32	19.91
6533	Read Phosphate Co., Charleston, S. C.	Read's Blood and Bone Mixture.....	9.32	1.16	.96	2.12	2.58	18.22
6521	Richmond Guano Co., Richmond, Va.	Gift Edge Guano.....	8.56	1.36	1.10	2.76	3.36	20.15
6241	do.....do.....	Concord.....	7.75	1.11	1.15	2.56	3.11	18.50
6423	do.....do.....	Davidson.....	8.41	1.21	1.18	2.39	2.91	18.45
6673	Roberson Mfg. Co., Lamberton, N. C.	1910-C.....	8.62	.96	1.28	2.24	2.72	18.03
6603	Robersonville Guano Co., Robersonville, N. C.	Little's High Grade Meal and Fish-Guano.....	7.71	.99	1.52	2.51	3.05	18.25
6604	do.....do.....	Robersonville Special Tobacco Grower.....	7.90	1.18	1.52	2.70	3.28	19.24

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.

MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Total Potash	Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia			
Brands claiming											
6690	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Simplex Ammoniated Phosphate.	Henderson	9.96	1.60	.78	2.43	2.95		\$ 19.37	
6768	do.	do.	St. Paul	9.21	1.61	.82	2.46	2.99		20.17	
6529	do.	do.	Vanceboro.	8.42	1.86	.74	2.60	3.16		19.51	
6970	do.	do.	Grafton	8.19	.61	2.74	3.38	4.11		19.34	
6243	do.	do.	Waxhaw	9.42	1.95	.75	2.70	3.28		22.39	
6326	do.	do.	Elizabeth City	9.07	1.83	.75	2.58	3.14		20.76	
6838	Scotland Neck Guano Co., Scotland Neck, N. C.	Biggs' 9-3 Fish Scrap Guano.	Winterville	8.23	.26	2.20	2.46	2.99		19.91	
6511	Southern Cotton Oil Co., Charlotte, N. C.	S. C. O. Co.'s Ammoniated Compound	Clarkton	8.88	.94	1.36	2.30	2.80		18.56	
6593	Southern Cotton Oil Co., Fayetteville, N. C.	do.	Fayetteville	7.06	.72	2.20	2.92	3.55		18.54	
6881	do.	do.	Cedar Creek	8.36	1.16	1.44	2.60	3.16		19.32	
6309	Southern Cotton Oil Co., Rocky Mount, N. C.	do.	Enfield	9.04	.27	1.91	2.18	2.65		19.28	
6476	Southern Cotton Oil Co., Wilson, N. C.	do.	Lucama	7.45	.56	1.40	1.96	2.38		18.20	
6400	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Ammoniated Phosphate.	Thomasville	8.01	.75	1.85	2.60	3.16		15.68	
6267	do.	do.	Wadesboro.	9.56	.19	2.73	2.92	3.55		18.93	
6510	do.	do.	Clarkton	9.06	1.29	1.64	2.93	2.56		21.82	
6449	do.	do.	Cherryville	8.54	1.39	1.36	2.75	3.34		21.37	
6474	do.	do.	Elkin	9.23	.23	2.40	2.63	3.20		20.09	
										20.28	

6827	Tennessee Chemical Co., Wilmington, N. C.	Ammoniated Superphosphate.....	Marshville.....	8.81	1.16	1.36	2.52	3.06	19.39
6591	Union Guano Co., Winston-Salem, N. C.	Union 3-3 Superphosphate.....	Fayetteville.....	9.08	1.50	1.04	2.54	3.09	19.75
6238	do.....	Union Special Superphosphate.....	Waxhaw.....	10.70	1.81	.71	2.52	3.06	21.28
6342	Union Seed and Fertilizer Co., Wilmington,	U. S. and F. Co.'s Brand No. 4.....	Maxton.....	9.25	.95	1.51	2.46	2.99	19.58
6577	do.....	do.....	Lumberton.....	9.01	1.56	1.08	2.61	3.21	20.10
6467	do.....	do.....	Wilmington.....	9.81	1.40	.98	2.38	2.89	19.81
6508	do.....	do.....	Clarkton.....	9.41	1.27	1.00	2.27	2.76	18.94
6325	Upshur, R. L., Guano Co., Norfolk, Va.	Upshur's Trade Mark for All Crops, 9-3, Ammoniated Guano.....	Shiloh.....	9.55	1.49	1.19	2.68	3.26	20.81
6642	Va.-Car. Chemical Co., Richmond, Va.	Ammoniated Compound.....	Waynesville.....	9.72	1.90	.64	2.54	3.09	20.39
6347	do.....	V.-C. C. Co.'s 9-3 Ammoniated Super- phosphate.....	Washington.....	9.51	2.07	.55	2.32	2.82	19.25
6442	do.....	V.-C. C. Co.'s Blue Ribbon Ammoniated Compound.....	Nashville.....	9.48	1.64	.76	2.40	2.92	19.56
6649	do.....	do.....	Waynesville.....	11.31	.58	.52	2.10	2.55	20.13
6339	do.....	V.-C. C. Co.'s Cotton Ammoniated Com- pound.....	Maxton.....	10.41	1.83	.57	2.40	2.92	20.49
6601	do.....	do.....	Robersonville.....	11.25	2.19	.30	2.19	3.03	21.71
6960	do.....	do.....	Hope Mills.....	9.06	1.52	.96	2.48	3.02	19.48
6625	do.....	do.....	Wake Forest.....	9.97	1.61	.48	2.12	2.58	18.87
6342	do.....	V.-C. C. Co.'s Morgan's Ammoniated Compound.....	Fairmont.....	10.80	1.94	.36	2.30	2.80	20.16
6639	do.....	do.....	Clyde.....	9.65	1.82	.70	2.52	3.06	20.34
6930	do.....	do.....	Battleboro.....	9.69	.47	2.06	2.53	3.08	20.32
6938	do.....	do.....	Battleboro.....	9.26	.38	1.92	2.30	2.80	18.92
6831	Winborne Guano Co., Norfolk, Va.	Special King Guano.....	Sans Souci.....	10.03	1.14	.98	2.12	2.58	18.93
Brand claiming				9.00			3.25	3.95	22.65
6637	Va.-Car. Chemical Co., Richmond, Va.	Croom's Special Compound.....	Battleboro.....	9.94	.86	2.30	3.16	3.81	23.21
Brand claiming				9.00			4.11	5.00	26.30
6316	Planters Cotton Oil and Fertilizer Co., Rocky Mount, N. C.	Meal and Fish Mixture No. 1.....	Whitakers.....	7.76	1.79	2.07	3.86	1.69	23.97

6718	Carolina Union Fertilizer Co., Norfolk, Va.	Carolina Union 2-10.....	Denton.....	9.60	1.22	.44	1.66	2.02	16.57
6435	Chickamauga Fertilizer Co., Chattanooga, Tenn.	Chickamauga No. 10-2 Fertilizer.....	Murphy.....	10.78	.65	1.51	1.59	1.93	17.46
6589	Columbia Guano Co., Norfolk, Va.	Columbia Duplex Ammoniated.....	Edenton.....	9.57	1.42	.68	2.10	2.55	18.39
6430	Coöperative Warehouse Co., Salisbury, N. C.	Farmers' Union 10-2 Ammoniated Com-pound.....	Statesville.....	9.55	.17	1.78	1.95	2.37	17.74
6777	Cotton States Fertilizer Works, Wilmington, N. C.	Cotton States 10-2 Ammoniated Phos-phate.....	Dunn.....	9.56	.06	2.04	2.10	2.55	18.38
6410	Farmers' Union Agency Co., Winston, N. C.	Farmers' Union Agency Co.'s 10-2.....	Winston.....	7.69	.23	.58	.98	1.19	11.81
6849	Marietta Fertilizer Co., Greensboro, N. C.	Marietta Ammoniated Superphosphate.....	Staley.....	9.63	.66	1.22	1.88	2.29	17.53
6465	Miller Fertilizer Co., Baltimore, Md.	Miller's Unexcelled.....	Mount Airy.....	9.99	1.21	.48	1.69	2.05	17.09
6569	Navassa Guano Co., Wilmington, N. C.	Navassa Ammoniated Superphosphate.....	Fayetteville.....	11.58	1.24	.32	1.56	1.89	18.13
6556	Old Buck Guano Co., Richmond, Va.	Old Buck Ammoniated Phosphate.....	High Point.....	10.44	1.00	.50	1.70	2.07	17.58
6475	Patapasco Guano Co., Baltimore, Md.	Patapasco Golden Crop Fertilizer.....	No. Wilkesboro.....	10.78	1.19	.46	1.65	2.09	17.71
6194	Pocomoke Guano Co., Norfolk, Va.	Pocomoke 2-10 Fertilizer.....	Lilesville.....	11.31	1.41	.48	1.80	2.30	19.35
6271	Read Phosphate Co., Charleston, S. C.	Read's Blood and Bone Mixture.....	Monroe.....	10.46	.71	1.05	1.76	2.11	17.85
6239	Richmond Guano Co., Richmond, Va.	Premium Guano.....	Concord.....	11.33	.95	.57	1.52	1.85	17.71
6509	Rock Hill Fertilizer Co., Rock Hill, S. C.	Piedmont Fertilizer.....	Pineville.....	9.97	.42	2.28	2.70	3.28	21.31
6645	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Ovation Brand Ammoniated Phosphate.....	Marshall.....	10.18	.98	.78	1.76	2.14	17.87
6157	do.	do.	Mount Airy.....	10.35	1.03	.80	1.83	2.22	18.04
6535	do.	do.	Ansonville.....	10.46	.91	.70	1.64	1.99	17.35
6544	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Ammoniated Phosphate.....	Fairmont.....	10.13	1.00	.90	1.90	2.31	18.11
6580	do.	do.	Maxton.....	8.85	.46	1.36	1.82	2.21	16.49
6546	Tennessee Chemical Co., Greensboro, N. C.	Ox Ammoniated Superphosphate.....	Julian.....	9.74	.62	1.00	1.62	1.97	16.54
6810	Tuscarora Fertilizer Co., Greensboro, N. C.	Tuscarora Ammoniated Superphosphate.....	Newton.....	12.54	.68	.96	1.64	1.99	19.43
6998	Tuscarora Fertilizer Co., Wilmington, N. C.	do.	Newton Grove.....	9.47	.78	.88	1.66	2.02	16.44
6945	Union Guano Co., Winston-Salem, N. C.	Union Special 10-2 Superphosphate.....	Germantown.....	10.98	1.20	.58	1.78	2.16	18.46
6445	do.	do.	Gastonia.....	10.81	1.09	.42	1.51	1.84	17.15
6576	Union Seed and Fertilizer Co., Charlotte, N. C.	U. S. and F. Co.'s Brand No. 2-C.....	Shelby.....	10.12	.68	1.16	1.84	2.21	17.85

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.

MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	
Brands claiming									
6801	Va.-Car. Chemical Co., Richmond, Va.	Durham Ammoniated Compound	Siler City	10.00			1.65	2.00	\$ 16.93
6282	do.	do.	Hillsboro.	11.11	1.40	.52	1.92	2.33	19.17
6467	do.	Mammoth Ammoniated Compound	No. Wilkesboro	9.58	1.29	.37	1.66	2.02	16.55
Brands claiming									
6261	Baugh & Sons Co., Norfolk, Va.	Baugh's Ammoniated Superphosphate	New Bern	12.06	1.35	.28	1.63	1.98	18.91
6515	do.	do.	Chadbourn	10.00			2.47	3.00	20.37
6562	do.	do.	Wadesboro.	9.85	1.81	.81	2.62	3.19	20.85
6827	do.	do.	Lucama	9.60	1.79	.82	2.61	3.17	20.56
6540	do.	do.	Vanceboro.	9.40	1.62	.86	2.48	3.02	19.82
6305	Carolina Union Fertilizer Co., Norfolk, Va.	Carolina Union 3-10	Roper	10.53	1.76	.68	2.44	2.97	20.77
6793	Columbia Guano Co., Norfolk, Va.	Columbia Pickax Ammoniated Phosphate	Hazelwood	9.68	1.76	.84	2.60	3.16	20.60
6760	Georgia Chemical Works, Augusta, Ga.	Georgia Special 10-3 Superphosphate	Lawndale	10.74	1.75	.91	2.66	3.23	21.91
6588	Imperial Company, Norfolk, Va.	Imperial 3-10 Fertilizer	Lumberton	10.36	1.52	.94	2.46	2.99	20.69
6596	do.	do.	Fayetteville	10.51	1.68	.94	2.62	3.19	21.51
6296	Phillips Fertilizer Co., Washington, N. C.	Phillips' Cotton and Corn Guano	Washington	11.48	1.52	1.06	2.58	3.14	22.32
6497	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Piedmont High Grade Ammoniated, Revised 1916.	Monroe	9.94	1.90	.74	2.64	3.21	21.03
6273	Read Phosphate Co., Charleston, S. C.	Read's Blood and Bone Mixture	Monroe	8.13	.41	2.03	2.44	2.97	18.38
				9.27	.62	1.66	2.28	2.77	18.85
				11.82	1.41	1.11	2.52	3.06	22.40

6617	Robertson Fertilizer Co., Norfolk, Va.	Robertson's 3-10 Guano.	Fayetteville.	9.70	1.58	.94	2.52	3.06	20.28
6421	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Ammoniated Phosphate.	Charlotte.	9.76	.15	2.68	2.83	3.44	21.65
6444	Union Guano Co., Winston, N. C.	Union Special Superphosphate.	Waco.	10.46	2.01	.60	2.61	3.17	21.42
6643	Va-Car. Chemical Co., Richmond, Va.	Mammoth Ammoniated Compound.	Waynesville.	8.77	1.90	.61	2.54	3.09	19.44
6441	do.	Victor Ammoniated Compound.	Cherryville.	9.72	1.79	.51	2.33	2.83	19.51
6443	do.	V.-C. C. Co.'s Ammoniated Compound.	Belmont.	9.93	1.77	.62	2.39	2.91	19.97
	Brands claiming			10.00			3.29	4.00	23.82
6602	American Agricultural Chemical Co., New York, N. Y.	Ammoniated Fertilizer, A. A. A.	Fayetteville.	10.38	2.20	1.02	3.22	3.91	21.10
6306	do.	do.	Matthews.	9.59	2.14	1.30	3.44	4.18	21.04
6735	do.	do.	Hazelwood.	9.21	2.02	1.30	3.32	4.01	23.15
6501	American Fertilizing Co., Norfolk, Va.	American 10-4 Ammoniated Compound.	Wadesboro.	11.78	2.70	.46	3.16	3.84	25.05
6752	Arps, George L. & Co., Norfolk, Va.	Arps' Substitute Brand.	Elizabeth City.	9.48	2.16	1.12	3.28	3.99	23.26
6517	Baugh & Sons Co., Philadelphia, Pa.	Baugh's High Grade Ammoniated Animal Base.	Chadbourn.	10.35	2.41	.86	3.27	3.95	21.08
6617	Carolina Union Fertilizer Co., Norfolk, Va.	Carolina Union 4-10.	Poplar Branch.	10.04	1.96	1.34	3.30	4.01	23.90
6835	Columbia Guano Co., Norfolk, Va.	Columbia Ammoniated Phosphate Mixture.	Elizabeth City.	10.57	1.64	.91	2.58	3.11	21.41
6802	Craven Chemical Co., New Bern, N. C.	C. C. Co.'s Ammoniated Compound, No. 10-4.	Sanford.	10.43	2.74	.60	3.31	4.06	21.46
6380	Edwan Fertilizer Co., Charleston, S. C.	Edwan Ammoniated Mixture.	Morven.	10.48	2.09	1.17	3.36	4.33	25.43
6597	Imperial Company, Norfolk, Va.	Imperial 4-10 Fertilizer.	Fayetteville.	10.01	2.36	1.04	3.40	4.13	21.29
6414	Navassa Guano Co., Wilmington, N. C.	Navassa High Grade Ammoniated Superphosphate.	Jacksonville.	10.37	3.37	.20	3.37	4.34	25.36
6687	Old Buck Guano Co., Richmond, Va.	Old Buck Double Ammoniated.	Williamston.	8.74	2.22	1.02	3.24	3.94	22.35
6807	Patapasco Guano Co., Baltimore, Md.	Patapasco Golden Opportunity Mixture.	Sanford.	10.51	2.48	.74	3.22	3.91	24.03
6246	Planters Fertilizer and Phosphate Co., Charleston, S. C.	Planters' Special Mixture.	Morven.	9.68	1.31	2.27	3.58	4.35	21.72
6758	Richmond Guano Co., Richmond, Va.	Ammoniated Phosphate, 10-4.	Shelby.	9.49	1.16	2.10	3.26	3.96	22.18
6452	Rock Hill Fertilizer Co., Rock Hill, S. C.	Piedmont Fertilizer Co., Rock Hill, S. C.	Pineville.	10.16	.65	2.48	3.13	3.81	23.31
6724	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Landmark Ammoniated Phosphate.	Oxford.	9.88	2.26	1.02	3.28	3.99	23.66
6723	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Ammoniated Phosphate.	Kernersville.	7.28	.10	1.10	4.20	5.11	21.92

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916. MIXED FERTILIZERS.

Inventory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphate	Water-Soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	
Brands claiming									
7004	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Ammoniated Phosphate	Kernersville	10.00			3.29	4.00	\$ 23.82
6656	Union Guano Co., Winston, N. C.	Union Special 10-4	Kinston	9.18	.64	2.90	3.54	4.30	24.65
6814	Yac-Car Chemical Co., Richmond, Va.	Y. C. Almont Ammoniated Compound	Robertsonville	7.93	2.26	1.02	3.28	3.99	21.71
Brand claiming									
6428	N. C. Farmers' Union, Statesville, N. C.	N. C. Farmers' Union 20 H-1 Guano	Statesville	12.12	3.14	.21	3.38	4.41	26.32
Brand claiming									
6255	Meadows, E. H. & J. A., Co., New Bern, N. C.	Meadows' All Crop Guano	New Bern	11.00			.82	1.00	14.44
Brand claiming									
6854	Crow Bros., Monroe, N. C.	Crow's Mixture	Monroe	11.33	.31	.50	.81	.98	11.73
Brands claiming									
6719	Armour Fertilizer Works, Greensboro, N. C.	Armour's Ammoniated Superphosphate Fertilizer	Indian Trail	11.00			2.06	2.50	19.65
6615	Baugh & Sons Co., Philadelphia, Pa.	Baugh's Old Standby Dissolved Animal Base	Cummock	7.01			2.26	2.75	16.50
6478	Coöperative Warehouse Co., Salisbury, N. C.	Farmers' Union Ammoniated Compound	Wake Forest	11.00			2.47	3.00	21.37
7060	Craven Chemical Co., New Bern, N. C.	C. C. Co.'s Ammoniated, No. 122	Fayetteville	12.06	.82	1.46	2.28	2.77	21.64
6716	Ober, G., & Sons Co., Baltimore, Md.	Ober's Climax Ammoniated Compound	Albemarle	12.00			1.65	2.00	18.93
6240	Richmond Guano Co., Richmond, Va.	Ammoniated Phosphate	Concord	11.92	.74	.94	1.68	2.04	18.98
6579	Robertson Fertilizer Co., Norfolk, Va.	Robertson's 2-12 Guano	Kings Mountain	12.06	.82	.88	1.70	2.07	19.20
			Wake Forest	12.98	.27	2.16	2.43	2.95	23.19
			Fayetteville	11.24	.90	1.16	2.06	2.50	19.89
			Albemarle	12.14	.92	1.11	2.06	2.50	20.79
			Concord	11.54	1.17	.75	1.92	2.33	19.60
			Kings Mountain	12.36	1.16	.58	1.74	2.41	19.67

6025	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Ammoniated Phosphate	Lyons	9.71	1.11	1.38	2.49	3.03	20.17
6589	Tidewater Guano Co., Norfolk, Va.	Tidewater 2-12 Guano	Jamesville	13.04	1.10	.58	1.68	2.91	20.10
6683	Upshur, R. L., Guano Co., Norfolk, Va.	Upshur's for All Crops 12-2 Ammoniated Phosphate	Shiloh	12.22	1.34	.52	1.86	2.26	20.03
6507	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Harvester Ammoniated Compound	Whiteville	9.63	1.83	.72	2.55	3.10	20.34
Brands claiming				12.00			3.29	4.00	25.82
6275	Read Phosphate Co., Charleston, S. C.	Read's Blood and Bone Mixture	Monroe	13.80	1.09	2.07	3.16	3.81	27.07
6841	Southern Cotton Oil Co., Shelby, N. C.	S. C. O. Co.'s Ammoniated Compound	Shelby	10.25	.74	1.88	2.62	3.19	21.25
Brand claiming							3.29	4.00	33.82
6409	Farmers' Union Agency Co., Winston-Salem, N. C.	Bulk (Bone)	Winston-Salem		.87	2.71	3.58	1.35	30.44
Brands claiming							7.42	9.02	46.16
6376	Home Fertilizer and Chemical Co., Baltimore, Md.	Cerealite Top Dressing	Wadesboro		7.75	.03	7.78	9.46	17.28
6404	do.	do.	Benson		7.49	.06	7.55	9.18	43.11
6853	Read Phosphate Co., Charleston, S. C.	Read's Top Dresser	Morven		3.58	3.00	6.58	8.00	44.44
Brand claiming				10.00				2.00	20.00
6359	Imperial Company, Norfolk, Va.	Imperial Bone and Potash	Fayetteville	10.52				2.08	20.92

RAW OR UNMIXED FERTILIZER MATERIALS.

Brands claiming				14.00					\$ 12.60
6584	Armour Fertilizer Works, Greensboro, N. C.	Armour's Star Phosphate	Shelby	11.20					12.78
6291	Atlantic Chemical Corporation, Norfolk, Va.	Atlantic 11 Per Cent Acid Phosphate	Burlington	13.86					12.47
6726	Norfolk Fertilizer Co., Norfolk, Va.	Oriana 14 Per Cent Acid Phosphate	Mount Airy	11.56					13.10
6442	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s 14 Per Cent Acid Phosphate	Waco	11.83					13.35
6279	do.	do.	Graham	11.21					12.79
Brands claiming				16.00					14.40
6352	Acme Mfg. Co., Wilmington, N. C.	16 Per Cent Acid Phosphate	Raeford	17.22					15.50
6574	do.	do.	Hope Mills	18.16					16.34

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.
RAW OR UNMIXED FERTILIZER MATERIALS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		Total Potash
Brands claiming									
6572	Acme Mfg. Co., Wilmington, N. C.	16 Per Cent Acid Phosphate	Hope Mills	16.00					\$ 14.40
6250	do.	do.	Waxhaw	18.35					16.51
6798	American Agricultural Chemical Co., New York, N. Y.	Red Rooster Acid Phosphate	Waynesville	18.03					16.23
6585	do.	16 Per Cent Superphosphate	Kings Mountain	16.20					14.58
6797	do.	do.	Haysboro	17.47					15.72
6722	do.	do.	Stanfield	15.45					13.91
6761	American Fertilizing Co., Norfolk, Va.	American High Grade Acid Phosphate	Lawndale	15.44					13.90
6397	do.	American 16 Per Cent Acid Phosphate	Wadesboro	16.59					14.93
6741	Armour Fertilizer Works, Baltimore, Md.	Armour's 16 Per Cent Acid Phosphate	Elizabeth City	16.16					14.51
6623	Armour Fertilizer Works, Wilmington, N. C.	do.	Fayetteville	16.57					14.91
6987	do.	do.	Stedman	16.31					14.68
6292	do.	do.	White Oak	16.26					14.63
6520	do.	do.	Parkton	15.38					13.84
6285	Armour Fertilizer Works, Greensboro, N. C.	do.	Greensboro	16.31					14.68
6249	do.	do.	Concord	16.27					14.64
6440	do.	do.	Waynesville	16.05					14.44
6323	Asheville Packing Co., Asheville, N. C.	Asheville Packing Co.'s Phosphoric Acid	Asheville	15.44					13.90
				15.00					13.50

6314	Atlantic Chemical Corporation, Norfolk, Va.	Atlantic High Grade 16 Per Cent Acid Phosphate.	Palmyra.....	15.97	14.37
6383	do.....	do.....	Evans Siding.....	16.35	14.72
6288	Baugh & Sons Co., Philadelphia, Pa.	Baugh's 16 Per Cent Acid Phosphate.....	Graham.....	16.05	14.44
6019	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Caraleigh 16 Per Cent Acid Phosphate.....	Fayetteville.....	17.92	16.13
6499	do.....	do.....	Roseboro.....	17.38	15.64
6464	do.....	do.....	Tillery.....	17.88	16.09
6404	do.....	do.....	Fairmont.....	17.85	16.06
6601	do.....	do.....	Fayetteville.....	17.21	15.49
6358	do.....	do.....	Fayetteville.....	16.81	15.13
6711	Carolina Union Fertilizer Co., Norfolk, Va.	Carolina Union 16 Per Cent.....	Mount Airy.....	15.80	14.22
6304	do.....	do.....	Roper.....	16.00	14.49
6792	Chattahoochee Fertilizer Co., Atlanta, Ga.	Chattahoochee Acid Phosphate.....	Franklin.....	17.07	15.36
6436	Chickamauga Fertilizer Co., Chattanooga, Tenn.	Chickamauga High Grade 16 Per Cent Acid Dissolved Bone.....	Murphy.....	16.09	14.48
6822	Coe-Mortimer Co., Charleston, S. C.	Coe-Mortimer's Dissolved Bone.....	Marshall.....	16.45	14.81
6814	do.....	do.....	Lucama.....	16.83	14.75
6357	Combahce Fertilizer Co., Charleston, S. C.	Combahce 16 Per Cent Dissolved Bone.....	Fayetteville.....	16.83	15.15
6355	do.....	do.....	Fayetteville.....	17.08	15.37
6369	do.....	do.....	Fayetteville.....	17.16	15.41
6356	do.....	do.....	Fayetteville.....	16.41	15.27
6363	do.....	do.....	Fayetteville.....	15.79	14.21
6560	Columbia Guano Co., Norfolk, Va.	Columbia High Grade 16 Per Cent Acid Phosphate.....	Mount Gilead.....	16.71	15.04
6803	do.....	do.....	Dunn.....	14.40	14.27
7026	Combahce Fertilizer Co., Charleston, S. C.	16 Per Cent Acid Phosphate.....	Monroe.....	16.65	14.98
6462	do.....	Combahce 16 Per Cent Dissolved Bone.....	Fayetteville.....	16.93	15.24
6313	Conestee Chemical Co., Wilmington, N. C.	16 Per Cent Acid Phosphate.....	Enfield.....	17.32	15.59
6828	Contentnea Guano Co., Wilson, N. C.	High Grade 16 Per Cent Acid Phosphate.....	Wilson.....	17.41	15.67

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916. RAW OR UNMIXED FERTILIZER MATERIALS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100				Total Potash Equivalent to Ammonia	Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-Soluble Nitrogen	Organic Nitrogen	Total Nitrogen		
Brands claiming									
6802	Contentnea Guano Co., Wilson, N. C.	High Grade 16 Per Cent Acid Phosphate	Battleboro	16.00					\$ 14.49
6480	Cooperative Warehouse Co., Salisbury, N. C.	Farmers' Union Acid Phosphate 16 Per Cent High Grade	Wake Forest	17.23					15.51
6429	do.	do.	Statesville	16.80					15.12
6780	do.	do.	Rockwell	16.93					15.24
6841	do.	do.	Albemarle	16.27					11.64
6832	do.	do.	Beulaville	17.23					15.51
6478	Cotton States Fertilizer Works, Atlanta, Ga.	Cotton States Acid Phosphate, 16 Per Cent High Grade	Mount Airy	17.01					15.31
6613	Craven Chemical Co., New Bern, N. C.	C. C. Co.'s Panama 16 Per Cent Acid Phosphate	Duke	16.90					15.21
6539	do.	do.	Monroe	16.70					15.03
6855	Crow Bros., Monroe, N. C.	Acid Phosphate	Monroe	16.20					14.58
6595	Eastern Cotton Oil Co., Hertford, N. C.	16 Per Cent Acid Phosphate	Edenton	16.55					11.89
6248	Etewan Fertilizer Co., Charleston, S. C.	Etewan 16 Per Cent Acid Phosphate	Morven	14.65					13.18
6458	Farmville Oil and Fertilizer Co., Farmville, N. C.	Acid Phosphate	Nashville	16.03					11.43
6559	Farmers Guano Co., Raleigh, N. C.	16 Per Cent Acid Phosphate	Mount Gilad	15.95					14.35
6516	Georgia Chemical Works, Augusta, Ga.	High Grade Dissolved Bone Phosphate	Lumber Bridge	17.31					15.58
6229	do.	do.	Greensboro	17.95					16.15
6420	do.	do.	Trenton	15.90					14.31
				16.80					15.12

6558	.....do.....	.....Ashboro.....	16.29	14.66
6592	Grandy, N. G., & Co., Elizabeth City, N. C.,	Grandy's High Grade 16 Per Cent Acid Phosphate,	Elm City.....	14.52
6770	Imperial Company, Norfolk, Va.....	Imperial H. G. Tennessee Acid Phosphate,	St. Paul.....	14.89
6374	.....do.....	.....do.....	Wadesboro.....	11.83
6356	.....do.....	.....do.....	Fairfield.....	11.61
6812	.....do.....	.....do.....	Lucama.....	11.96
6471	Joscy, N. B., Gunno Co., Tarboro, N. C.....	Joscy's 16 Per Cent Acid Phosphate.....	Tillery.....	14.22
6453	.....do.....	.....do.....	Palmyra.....	13.76
6871	MacMurphy Co., The, Charleston, S. C.....	High Grade Acid Phosphate.....	Morven.....	15.49
6277	.....do.....	.....do.....	Morven.....	11.59
6549	.....do.....	.....do.....	St. Paul.....	15.01
6477	Marietta Fertilizer Co., Greensboro, N. C.....	Marietta High Grade Acid Phosphate.....	No. Wilkesboro.....	11.55
6256	Martin Fertilizer Co., Norfolk, Va.....	Martin's Acid Phosphate.....	Haw River.....	11.78
6394	.....do.....	.....do.....	Dunn.....	11.62
6608	.....do.....	.....do.....	Angier.....	11.61
6940	.....do.....	.....do.....	Dunn.....	11.57
6610	.....do.....	.....do.....	Duke.....	11.49
6252	Meadows, E. H. & J. A., Co., New Bern, N. C.....	Meadows' Diamond Acid Phosphate.....	New Bern.....	11.81
6344	McNair Phosphate Co., Laurinburg, N. C.....	Acid Phosphate.....	Laurinburg.....	13.42
6984	.....do.....	.....do.....	St. Paul.....	13.72
6605	Miller Fertilizer Co., Baltimore, Md.....	.....do.....	Duke.....	15.62
6413	Navassa Gunno Co., Wilmington, N. C.....	Navassa 16 Per Cent Acid Phosphate.....	Maysville.....	14.89
6489	.....do.....	.....do.....	Red Springs.....	15.03
6265	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.....	16 Per Cent Acid Phosphate.....	New Bern.....	12.75
6869	.....do.....	.....do.....	Wildwood.....	14.80
6848	.....do.....	.....do.....	Boulaville.....	14.28
				15.87

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.

RAW OR UNMIXED FERTILIZER MATERIALS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		Total Potash
Brands claiming									
6398	Nitrate Agencies Co., New York, N. Y.	High Grade 16 Per Cent Acid Phosphate.	Williamston.	16.00					\$ 14.40
6396	do.	do.	Manchester.	16.48					11.83
6355	do.	do.	Elizabeth City.	15.92					14.33
6457	do.	do.	Scotland Neck.	16.12					14.51
6931	do.	do.	Palmyra.	16.57					11.91
6952	do.	do.	Palmyra.	16.58					14.92
6456	do.	do.	Spring Hill.	16.51					14.86
6269	Norfolk Fertilizing Co., Norfolk, Va.	Oriana 16 Per Cent Acid Phosphate.	Wadesboro.	15.83					14.25
6595	do.	do.	Fayetteville.	17.79					16.01
6507	do.	do.	Fayetteville.	18.06					16.25
6731	Ober, G., & Sons Co., Baltimore, Md.	Ober's High Grade Acid Phosphate.	Statesville.	16.22					14.60
6663	Old Buck Guano Co., Richmond, Va.	Old Buck 16 Per Cent Acid Phosphate.	Reidsville.	16.91					15.22
6393	Palmetto Guano Corporation, Columbia, S. C.	Palmetto Acid Phosphate.	Wadesboro.	16.61					14.95
6394	do.	do.	Albemarle.	17.03					15.33
6427	do.	do.	Charlotte.	16.75					15.07
6567	Pamlico Chemical Co., Washington, N. C.	Pamlico High Grade Acid Phosphate.	Hope Mills.	17.03					15.33
7021	do.	do.	Beaufort.	16.07					14.46
				16.80					15.12

6068	do.....do.....	Washington.....	16.60	14.94
6083	do.....do.....	Vander.....	16.53	11.88
6476	Patapasco Guano Co., Baltimore, Md.....	No. Wilkesboro.....	18.09	16.28
6297	Phillips Fertilizer Co., Washington, N. C.....	Washington.....	16.15	14.53
6628	Planters Cotton Oil and Fertilizer Co., Rocky Mount, N. C.....	Whitakers.....	14.69	13.32
6493	Planters Fertilizer and Phosphate Co., Charleston, S. C.....	Wadesboro.....	17.05	15.35
6627	Pocahontas Guano Co., Lynchburg, Va.....	Enfield.....	17.48	15.73
6566	do.....do.....	Stokesdale.....	17.28	15.55
6245	Pocomoke Guano Co., Norfolk, Va.....	Morven.....	16.58	14.92
6504	do.....do.....	Stanfield.....	17.38	15.61
6311	do.....do.....	Enfield.....	16.93	15.02
6298	do.....do.....	Belhaven.....	15.87	14.28
6547	do.....do.....	St. Paul.....	17.64	15.88
6446	Powhatan Chemical Co., Richmond, Va.....	Black Creek.....	16.37	14.73
7028	do.....do.....	Battleboro.....	17.36	15.62
6809	Rasin-Monumental Co., Baltimore, Md.....	Lucama.....	16.04	14.41
6534	Read Phosphate Co., Charleston, S. C.....	Ansonville.....	17.46	15.71
6425	Richmond Guano Co., Richmond, Va.....	Hendersonville.....	16.30	14.67
6580	do.....do.....	Kings Mountain.....	16.12	14.51
6662	do.....do.....	Walnut Cove.....	15.89	14.30
6434	do.....do.....	Clyde.....	15.82	14.24
6578	Robertson Fertilizer Co., Norfolk, Va.....	Kings Mountain.....	15.73	14.16
6602	Robersonville Guano Co., Robersonville, N. C.....	Robersonville.....	16.12	14.51
6242	Royster, F. S., Guano Co., Norfolk, Va.....	Waxhaw.....	16.55	11.89
6226	do.....do.....	Kernersville.....	16.76	15.08
6353	do.....do.....	Elizabeth City.....	16.02	11.42

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.

RAW OR UNMIXED FERTILIZER MATERIALS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphate	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		Total Potash
Brands claiming									
6996	Reyster, F. S., Guano Co., Norfolk, Va.	Reyster's High Grade 16 Per Cent Acid Phosphate.	Dunn	16.00					\$ 14.40
6451	do.	do.	Waco	17.12					15.41
6695	do.	do.	Tarboro	17.07					15.36
6646	do.	do.	Marshall	16.79					15.11
6767	Southern Cotton Oil Co., Charlotte, N. C.	do.	Rennett	16.20					14.58
6615	Southern Cotton Oil Co., Fayetteville, N. C.	S. C. O. Co.'s 16 Per Cent Acid Phosphate.	Fayetteville	16.88					15.19
6842	Southern Cotton Oil Co., Shelby, N. C.	do.	Shelby	16.56					14.90
6811	do.	do.	Cliffside	17.32					15.59
6797	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Special High Grade Acid Phosphate.	Moneure	15.79					14.21
6266	do.	do.	Wadesboro	16.31					14.68
6581	do.	do.	Maxton	17.21					15.49
6433	do.	do.	Murphy	15.85					14.26
6550	do.	do.	Oxford	16.04					14.44
6450	do.	do.	Cherryville	15.88					14.29
6448	do.	do.	Lincolnton	16.47					14.83
6581	do.	do.	Maxton	16.31					14.68
				15.85					14.26

6454	Tennessee Chemical Co., Greensboro, N. C.	Ox Tennessee High Grade Acid Phosphate.	Mount Airy.	15.98	14.38
6470	Tuscarora Fertilizer Co., Greensboro, N. C.	Tuscarora Acid Phosphate.	Elkin.	16.18	14.56
7015	do.	do.	Albemarle.	16.08	14.17
6236	Union Guano Co., Winston-Salem, N. C.	Union 16 Per Cent Acid Phosphate.	Waxhaw.	17.32	15.59
6979	do.	do.	St. Paul.	17.32	15.59
6603	do.	do.	Lumber Bridge.	16.56	14.90
6978	do.	do.	St. Paul.	16.56	14.90
6468	Union Seed and Fertilizer Co., Wilmington, N. C.	do.	Norblet.	17.11	15.19
6682	Upshur, R. L., Guano Co., Norfolk, Va.	Upshur's 16 Per Cent Acid Phosphate.	Shiloh.	16.66	14.99
6320	Va-Car. Chemical Co., Richmond, Va.	V-C. C. Co.'s Click's Acid Phosphate, 16 Per Cent.	Hendersonville.	15.97	14.37
6468	do.	Southern Chemical Co.'s Comet 16 Per Cent Acid Phosphate.	No. Wilkesboro.	15.03	13.53
6641	do.	do.	Marshall.	17.15	15.41
6222	do.	Durham Fertilizer Co.'s Best Acid Phosphate.	Mocksville.	15.46	13.91
6281	do.	Owl Brand High Grade Acid Phosphate.	Hillsboro.	16.57	14.91
6432	do.	S. W. Travers & Co.'s Champion Acid Phosphate.	Clyde.	15.63	14.07
6384	do.	V-C. C. Co.'s 16 Per Cent Acid Phosphate.	Kinston.	16.77	15.09
6349	do.	do.	Washington.	17.35	15.60
6508	do.	do.	Pineville.	16.81	15.13
6280	do.	do.	Graham.	16.96	15.26
6482	do.	do.	Seven Springs.	17.23	15.51
6438	do.	do.	Waynesville.	16.18	14.83
6391	do.	do.	Wadesboro.	15.07	13.56
6308	do.	do.	Abskie.	14.95	13.45
6762	do.	Virginia State Fertilizer Co.'s Bull Run Acid Phosphate.	Statesville.	15.95	14.35
6830	Winborne Guano Co., Norfolk, Va.	High Grade 16 Per Cent Acid Phosphate	Sans Souci.	16.08	14.17

Brands claiming			14.81	59.24
7020	Baker, H. J., & Bro., New York, N. Y.	Nitrate of Soda	Wadesboro.	62.56
6874	Grace, W. R., & Co., New York, N. Y.	do.	Sanareand	63.28
6801	do.	do.	Rosboro.	62.88
6515	do.	do.	Lumber Bridge.	62.80
6954	do.	do.	Palmyra.	62.72
6964	do.	do.	St. Paul.	61.76
6997	Swift & Co. Fertilizer Works, Atlanta, Ga.	Pure Nitrate of Soda	Dunn.	62.72
6829	Wessell, David & Co., New York, N. Y.	Nitrate of Soda	Morven.	61.60
6530	do.	do.	Wadesboro.	61.36
Brands claiming			15.00	60.00
7063	Acme Mfg. Co., Wilmington, N. C.	Nitrate of Soda	Dunn.	60.32
7056	Nitrate Agencies Co., Norfolk, Va.	do.	Williamston.	61.68
Brand claiming			20.56	80.24
6519	Acme Mfg. Co., Wilmington, N. C.	Sulphate of Ammonia	Lumber Bridge	82.80
Brand claiming			20.75	83.00
6977	Barrett Co., Tho., New York, N. Y.	Acridian Sulphate of Ammonia	Stedman.	83.68

ANALYSIS OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1916.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Total Potash	Relative Value per Ton at Factory	
				Total Phosphoric Acid	Water-Soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia			
Brands claiming											
6361	Farm Bell Fertilizer Co., Norfolk, Va.	Farm Bell Mixture.	Burlington	10.00	1.17	.33	1.50	1.82	1.16	21.10	
6358	do.	do.	Elizabeth City	9.82	1.57	.19	1.76	2.11	1.08	20.65	
Brands claiming											
6371	Farm Bell Fertilizer Co., Norfolk, Va.	Farm Bell Mixture.		10.00			1.65	2.00	1.50	23.43	
Brand claiming											
6582	Peruvian Guano Corporation, Charleston, S. C.	Genuine Peruvian Guano, Ex. S. S. Milverton.	Maxton	10.00			10.70	13.01	2.25	64.19	
6400	Peruvian Guano Corporation, Charleston, S. C.	Genuine Peruvian Guano, Ex. S. S. Madura.	Benson	11.32	6.15	3.24	9.39	11.12	3.29	66.89	
Brands claiming											
6675	Peruvian Guano Corporation, Charleston, S. C.	Genuine Peruvian Guano, Ex. S. S. Chipawa.	Lamberton	13.95	2.50	.88	3.38	4.11	2.14	36.06	
6693	do.	do.	Benson	14.00	2.12	1.02	3.14	3.82	1.92	34.00	
Brand claiming											
6583	Peruvian Guano Corporation, Charleston, S. C.	Peruvian Guano Top Dresser.	Maxton	9.55	6.10	.38	6.48	7.88		34.86	
Brands claiming											
6552	Baugh & Sons Co., Norfolk, Va.	Raw Bone Meal.	High Point	20.65	.30	3.40	3.70	4.50		32.06	
6668	do.	do.	Greensboro	21.50	.30	3.62	3.92	4.77		33.66	
Brand claiming											
6346	Armour Fertilizer Works, Wilmington, N. C.	Raw Bone Meal.	Maxton	22.00			3.70	4.50		35.34	
Brands claiming											
				20.20			3.58	4.35		33.22	

Brand claiming				17.00	13.60
6417	Union Guano Co., Winston-Salem, N. C.	Union Brand Ground Slag	Reidsville.	15.42	12.34
Brand claiming				18.00	14.40
6824	Coe-Mortimer Co., Charleston, S. C.	Genuine Tree Brand Thomas Phosphate	Marshville.	17.15	13.72
6496	Tennessee Coal, Iron and Railroad Co., Birmingham, Ala.	Duplex Basic Phosphate, AA	Pilot Mountain	18.65	14.92
Brand claiming				28.00	22.40
6231	Central Phosphate Co., Mount Pleasant, Tenn.	Tennessee Phosphate.	Greensboro.	26.45	21.16
Brand claiming				29.75	23.80
6453	Federal Chemical Co., Columbia, Tenn.	Daybreak Tennessee Brown Phosphate Rock.	Lincolnton	28.20	22.56

*Total Phosphoric Acid in Bone Meal, Peruvian Guano, and Basic Slag valued at 4 cents per pound.

II. ANALYSIS COTTON SEED MEAL.

Laboratory Number	Name and Address of Manufacturer	Where Sampled	Per Cent Nitrogen Guaranteed		Equivalent to Ammonia		Per Cent Nitrogen Found		Equivalent to Ammonia	
803	Armour Fertilizer Works, Wilmington, N. C.	Fayetteville	6.17	7.50	6.04	7.34				
5496	Arrington-Bissett Co., Nashville, N. C.	Nashville	6.17	7.50	6.05	7.36				
5509	Ashcraft-Wilkinson Co., Atlanta, Ga.	Kinston	6.17	7.50	6.08	7.39				
5493	Atlantic Cotton Oil Co., Atlanta, Ga.	Murphy	6.17	7.50	5.61	6.82				
836	Battleboro Oil Co., Battleboro, N. C.	Battleboro	6.17	7.50	6.06	7.37				
858	do	Battleboro	6.17	7.50	5.68	6.91				
859	do	Battleboro	6.17	7.50	6.06	7.37				
860	do	Battleboro	6.17	7.50	6.12	7.44				
861	do	Battleboro	6.17	7.50	5.94	7.22				
884	do	Battleboro	6.17	7.50	5.88	7.15				
891	do	Battleboro	6.17	7.50	6.22	7.56				
5476	Bertie Cotton and Oil Co., Aulander, N. C.	Ahoskie	6.17	7.50	5.93	7.21				
5494	Bowen & Murphy, Birmingham, Ala.	Nashville	6.17	7.50	5.97	7.26				
757	Brodie, F. W., & Co., Memphis, Tenn.	Lucama	6.17	7.50	6.37	7.74				
745	do	Williamston	6.17	7.50	5.65	6.87				
744	do	Williamston	6.17	7.50	6.09	7.40				
895	do	Williamston	6.17	7.50	6.02	7.32				
5497	do	Nashville	6.17	7.50	6.12	7.44				
5491	Buckeye Cotton Oil Co., Atlanta, Ga.	Andrews	6.17	7.50	6.19	7.53				
828	do	Moncure	6.17	7.50	5.60	6.81				
5492	Buckeye Cotton Oil Co., Charlotte, N. C.	Balsam	6.17	7.50	5.87	7.14				
5483	do	Statesville	6.17	7.50	5.83	7.09				
872	do	Lawndale	6.17	7.50	5.72	6.95				
853	do	Morven	6.17	7.50	6.02	7.32				
849	do	Ellerbe	6.17	7.50	5.60	6.81				
894	do	Fayetteville	6.17	7.50	6.08	7.39				
794	do	Fayetteville	6.17	7.50	5.82	7.08				
718	do	Wadesboro	6.17	7.50	5.99	7.28				
721	do	Wadesboro	6.17	7.50	5.73	6.97				
758	do	Lucama	6.17	7.50	6.03	7.33				
5498	Buckeye Cotton Oil Co., Cincinnati, Ohio	Black Mountain	6.17	7.50	5.64	6.86				
837	do	Spring Hope	6.17	7.50	5.82	7.03				
5490	Buckeye Cotton Oil Co., Macon, Ga.	Murphy	6.17	7.50	6.13	7.45				
887	Cheraw Oil and Fertilizer Co., Cheraw, S. C.	Wadesboro	6.17	7.50	5.70	6.93				
754	Chowan Cotton Oil and Fertilizer Co., Edenton, N. C.	Fillery	6.17	7.50	6.00	7.29				
5501	do	Hobbsville	6.17	7.50	5.80	7.05				
6467	Campobello Oil Mill, Campobello, S. C.	Hendersonville	6.17	7.50	5.03	6.12				
850	Consumers Cotton Oil Co., Tarboro, N. C.	Palmyra	6.17	7.50	5.86	7.12				

II. ANALYSIS COTTON SEED MEAL.

Laboratory Number	Name and Address of Manufacturer	Where Sampled	Per Cent Nitrogen		Guaranteed Equivalent		Ammonia	
			Found	to	Per Cent Nitrogen	Found	to	Ammonia
896	Consumers Cotton Oil Co., Tarboro, N. C.....	Williamston	6.17	7.50	5.58	6.78		
5511	Cotton Oil and Fertilizer Mills, New Bern, N. C.	Williamston	6.17	7.50	5.36	6.52		
835	Cotton Oil and Ginning Co., Scotland Neck, N. C.	Scotland Neck	6.17	7.50	5.76	7.00		
838	.....do.....	Palmyra.....	6.17	7.50	5.86	7.12		
5495	.....do.....	Scotland Neck..	6.17	7.50	5.81	7.06		
5486	Cotton States Seed and Fertilizer Co., Macon, Ga.	Kinston.....	6.17	7.50	6.07	7.38		
5508	Dixie Guano Co., Suffolk, Va.....	Hobbsville.....	6.17	7.50	5.58	6.78		
873	Dunn Oil Mills Co., Dunn, N. C.....	Newton Grove...	6.17	7.50	5.46	6.64		
827	.....do.....	Dunn.....	6.17	7.50	5.84	7.10		
5468	Elba Mfg. Co., Charlotte, N. C.....	Hazelwood.....	6.17	7.50	5.61	6.82		
5481	.....do.....	Benson.....	6.17	7.50	6.21	7.55		
841	.....do.....Maxton, N. C.....	Norman.....	6.17	7.50	6.08	7.39		
5507	Elizabeth City Oil and Fertilizer Co., Elizabeth City, N. C.	Elizabeth City....	6.17	7.50	6.26	7.61		
755	Empire Cotton Oil Co., Madison, Ga.....	Trenton.....	6.17	7.50	5.85	7.11		
830	Farmers Cotton Oil Co., Wilson, N. C.....	Lucama.....	6.17	7.50	6.00	7.29		
829	.....do.....	Lucama.....	6.17	7.50	5.44	6.61		
5484	Farmers Warehouse and Oil Mill, Mooresville, N. C.	Mooresville.....	6.17	7.50	6.05	7.36		
5506	Havens Oil Co., Washington, N. C.....	Jamesville.....	6.17	7.50	6.02	7.32		
849	.....do.....	Palmyra.....	6.17	7.50	5.96	7.25		
5469	Home Oil Mill, New Decatur, Ala.....	Sylva.....	6.17	7.50	5.55	6.75		
816	Kershaw Oil Mill, Kershaw, S. C.....	Rosman.....	6.17	7.50	5.88	7.15		
5470	.....do.....	Tryon.....	6.17	7.50	5.75	6.99		
5499	Kings Mountain Cotton Oil Co., Kings Moun- tain, N. C.	Kings Mountain..	6.17	7.50	6.18	7.51		
5489	Lanier Bros., Nashville, Tenn.....	Asheville.....	6.17	7.50	6.17	7.50		
5471	.....do.....	Asheville.....	6.17	7.50	5.83	7.09		
5487	Lenoir Oil and Ice Co., Kinston, N. C.....	Kinston.....	6.17	7.50	6.19	7.53		
874	Lee County Cotton Oil Co., Sanford, N. C.....	Dunn.....	6.17	7.50	6.12	7.44		
798	.....do.....	Duke.....	6.17	7.50	6.00	7.29		
5502	Marion Cotton Oil Co., Marion, N. C.....	Whiteville.....	6.17	7.50	6.14	7.47		
811	Morgan Oil and Fertilizer Co., Red Springs, N. C.	Red Springs.....	6.17	7.50	5.86	7.12		
814	.....do.....	Red Springs.....	6.17	7.50	6.16	7.49		
869	.....do.....	Reunert.....	6.17	7.50	6.04	7.34		
855	Mount Gilead Cotton Oil Co., Mount Gilead, N. C.	Troy.....	6.17	7.50	6.22	7.56		
5510	.....do.....	Ellerbe.....	6.17	7.50	6.22	7.56		
823	Navassa Guano Co., Wilmington, N. C.	White Oak.....	6.17	7.50	6.20	7.54		
5485	.....do.....	Maysville.....	6.17	7.50	5.37	6.53		
844	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Fort Barnwell....	6.17	7.50	6.06	7.37		
894	.....do.....	Williamston.....	6.17	7.50	5.36	6.52		

II. ANALYSIS COTTON SEED MEAL.

Laboratory Number	Name and Address of Manufacturer	Where Sampled	Per Cent Nitrogen Guaranteed		Equivalent to Ammonia		Per Cent Nitrogen Found		Equivalent to Ammonia	
5488	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Seven Springs	6.17	7.50	5.79	7.04				
5472	Newton County Oil Mills, Covington, Ga.	Bryson City	6.17	7.50	6.01	7.31				
552	N. C. Farmers' Union, Statesville, N. C.	Statesville	6.17	7.50	5.62	6.83				
518	Pamlico Chemical Co., Washington, N. C.	Grifton	6.17	7.50	6.18	7.51				
759	Phoenix Cotton Oil Co., Memphis, Tenn.	Spring Hill	6.17	7.50	6.10	7.42				
5477	Planters Cotton Oil and Fertilizer Co., Rocky Mount, N. C.	Whitakers	6.17	7.50	6.05	7.36				
797	Raleigh Cotton Oil Co., Raleigh, N. C.	Duke	6.17	7.50	6.24	7.59				
796	do.	Duke	6.17	7.50	6.14	7.47				
766	do.	Raleigh	6.17	7.50	6.14	7.47				
881	Robeson Mfg. Co., Lumberton, N. C.	St. Paul	6.17	7.50	6.26	7.61				
868	do.	St. Paul	6.17	7.50	6.16	7.49				
867	do.	St. Paul	6.17	7.50	5.92	7.20				
824	do.	Tar Heel	6.17	7.50	6.06	7.37				
816	do.	St. Paul	6.17	7.50	5.78	7.03				
689	do.	Tar Heel	6.17	7.50	6.11	7.43				
727	do.	Tar Heel	6.17	7.50	6.03	7.33				
750	Rowland Oil and Fertilizer Co., Rowland, N. C.	Fairmont	6.17	7.50	5.82	7.08				
748	do.	Fairmont	6.17	7.50	6.11	7.43				
747	do.	Fairmont	6.17	7.50	5.85	7.11				
746	do.	Fairmont	6.17	7.50	5.89	7.16				
882	Royster, F. S., Guano Co., Norfolk, Va.	Mount Hull	6.17	7.50	6.58	8.00				
883	Southern Cotton Oil Co., Camden, S. C.	Morven	6.17	7.50	5.40	6.57				
789	do. Charlotte, N. C.	Hope Mills	6.17	7.50	5.68	6.91				
795	do.	Lumber Bridge	6.17	7.50	5.64	6.36				
799	do.	Pineville	6.17	7.50	5.56	6.76				
809	do.	Parkton	6.17	7.50	5.80	7.05				
813	do.	Red Springs	6.17	7.50	5.22	6.35				
866	do.	Hope Mills	6.17	7.50	5.76	7.00				
879	do.	St. Paul	6.17	7.50	5.88	7.15				
5480	do.	Wadesboro	6.17	7.50	5.51	6.70				
856	do. Concord, N. C.	Concord	6.17	7.50	4.98	6.05				
5512	do.	Salisbury	6.17	7.50	5.28	6.42				
839	do. Conetoe, N. C.	Norblet	6.17	7.50	5.82	7.08				
790	do. Fayetteville	Hope Mills	6.17	7.50	5.32	6.47				
786	do.	St. Paul	6.17	7.50	5.54	6.74				
788	do.	Hope Mills	6.17	7.50	5.90	7.17				
787	do.	St. Paul	6.17	7.50	5.56	6.76				
785	do.	Hope Mills	6.17	7.50	5.93	7.15				

II. ANALYSIS COTTON SEED MEAL.

Laboratory Number	Name and Address of Manufacturer	Where Sampled	Per Cent Nitrogen Guaranteed		Equivalent to		Per Cent Nitrogen Found		Equivalent to	
			Ammonia		Ammonia		Ammonia		Ammonia	
752	Southern Cotton Oil Co., Fayetteville, N. C.	Fayetteville	6.17	7.50	5.41	6.58				
751	do.	Fayetteville	6.17	7.50	5.32	6.47				
728	do.	Fayetteville	6.17	7.50	5.83	7.09				
723	do.	Fayetteville	6.17	7.50	5.27	6.41				
722	do.	Carvers Falls	6.17	7.50	5.49	6.67				
719	do.	Fayetteville	6.17	7.50	5.77	7.02				
710	do.	Fayetteville	6.17	7.50	5.80	7.05				
888	do.	Fayetteville	6.17	7.50	5.26	6.40				
845	do.	Fayetteville	6.17	7.50	5.16	6.27				
807	do.	Fayetteville	6.17	7.50	5.38	6.54				
805	do.	Fayetteville	6.17	7.50	5.44	6.61				
793	do.	Fayetteville	6.17	7.50	5.22	6.35				
792	do.	Fayetteville	6.17	7.50	5.18	6.30				
708	do.	Fayetteville	6.17	7.50	5.17	6.29				
709	do.	Fayetteville	6.17	7.50	5.41	6.58				
865	do.	Hope Mills	6.17	7.50	5.56	6.76				
863	do.	Hope Mills	6.17	7.50	5.54	6.74				
819	do.	Hope Mills	6.17	7.50	5.74	6.98				
791	do.	Hope Mills	6.17	7.50	5.88	7.15				
810	do.	Lumber Bridge	6.17	7.50	5.16	6.27				
808	do.	Lumber Bridge	6.17	7.50	5.46	6.64				
880	do.	St. Paul	6.17	7.50	5.60	6.81				
817	do.	St. Paul	6.17	7.50	5.54	6.74				
815	do.	St. Paul	6.17	7.50	5.50	6.69				
842	do.	Cedar Creek	6.17	7.50	5.52	6.71				
886	do. Goldsboro, N. C.	Battleboro	6.17	7.50	6.16	7.49				
834	do.	Battleboro	6.17	7.50	5.90	7.17				
5478	do.	Whitakers	6.17	7.50	5.55	6.75				
875	do.	Clinton	6.17	7.50	5.50	6.69				
864	do. Monroe, N. C.	Rennert	6.17	7.50	5.46	6.64				
887	do.	Wingate	6.17	7.50	5.50	6.69				
5482	do. Selma, N. C.	Benson	6.17	7.50	5.95	7.25				
5500	do. Shelby, N. C.	Kings Mountain	6.17	7.50	5.06	6.15				
885	do. Tarboro, N. C.	Battleboro	6.17	7.50	5.74	6.98				
5479	do.	Palmyra	6.17	7.50	5.43	6.60				
857	do.	Spring Hill	6.17	7.50	5.60	6.81				
720	do. Wadesboro, N. C.	Wadesboro	6.17	7.50	5.89	7.16				
822	do.	Morven	6.17	7.50	5.70	6.93				

II. ANALYSIS COTTON SEED MEAL.

Laboratory Number	Name and Address of Manufacturer	Where Sampled	Per Cent	Guaranteed	Equivalent to Ammonia	Per Cent	Equivalent to Ammonia
			Nitrogen	Nitrogen		Nitrogen		Found
554	Southern Cotton Oil Co., Wadesboro, N. C.	Morven	6.17	7.50	5.74	6.93	
851	do. Wilson, N. C.	Lucama	6.17	7.50	5.06	6.15	
817	Swift & Co. Oil Mill, Columbia, S. C.	Brevard	6.17	7.50	5.42	6.59	
813	Trent Cotton Oil Co., Pollocksville, N. C.	Trenton	6.17	7.50	6.38	7.76	
871	Tuscarora Fertilizer Co., Wilmington, N. C.	Dunn	6.17	7.50	5.72	7.05	
890	Union Guano Co., Winston-Salem, N. C.	Elm City	6.17	7.50	5.76	7.00	
719	Union Seed and Fertilizer Co., Atlanta, Ga.	Morven	6.17	7.50	6.03	7.33	
812	do.	Red Springs	6.17	7.50	6.32	7.68	
711	do. Charlotte, N. C.	Morven	6.17	7.50	5.55	6.75	
731	do.	Rockingham	6.17	7.50	5.73	6.97	
5474	do.	Balsam	6.17	7.50	5.75	6.99	
713	do. Henderson, N. C.	Williamston	6.17	7.50	6.01	7.31	
870	do. Raleigh, N. C.	Dunn	6.17	7.50	5.72	6.95	
694	do.	Dunn	6.17	7.50	6.09	7.40	
726	do.	Dunn	6.17	7.50	5.97	7.26	
693	do.	Newton Grove	6.17	7.50	6.15	7.48	
897	do.	Williamston	6.17	7.50	5.52	6.71	
848	do. Wilmington, N. C.	Bethel	6.17	7.50	5.44	6.61	
876	do.	Benson	6.17	7.50	5.68	6.91	
801	do.	Fayetteville	6.17	7.50	5.80	7.05	
707	do.	Fayetteville	6.17	7.50	5.65	6.87	
724	do.	Fayetteville	6.17	7.50	5.69	6.92	
806	do.	Fayetteville	6.17	7.50	6.04	7.34	
890	do.	Four Oaks	6.17	7.50	5.84	7.10	
753	do.	Norfleet	6.17	7.50	5.94	7.22	
802	do.	Roseboro	6.17	7.50	5.54	6.74	
862	do.	St. Paul	6.17	7.50	5.70	6.93	
878	do.	St. Paul	6.17	7.50	5.72	6.95	
690	do.	Tar Heel	6.17	7.50	5.83	7.09	
725	do.	Vander	6.17	7.50	5.75	6.99	
825	do.	White Oak	6.17	7.50	5.58	6.78	
756	Woodard & Whitley, Whitakers, N. C.	Black Creek	6.17	7.50	5.61	6.82	
760	do.	Nashville	6.17	7.50	5.85	7.11	
5503	Woodruff Oil and Fertilizer Co., Woodruff, S. C.	Brevard	6.17	7.50	5.68	6.91	
5175	Wilmington Oil Mill, Pelzer, S. C.	Hendersonville	6.17	7.50	5.01	6.09	

LEAF TOBACCO REPORT FOR SEPTEMBER, 1916

Pounds sold for producers	53,200,004
Pounds sold for dealers	3,833,944
Pounds sold for warehouses	2,464,116
Total.....	59,498,064



THE BULLETIN
OF THE
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE
RALEIGH

Vol. 37, No. 11

NOVEMBER, 1916

Whole No. 226

COMMERCIAL FEEDS

PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Postoffice at Raleigh, N. C., as second class matter,
February 7, 1901, under Act of June 6, 1900.

EDWARDS & BROUGHTON PRINTING CO.
STATE PRINTERS

STATE BOARD OF AGRICULTURE

W. A. GRAHAM, Commissioner, *ex officio* Chairman, Raleigh.

F. P. LATHAM.....	Belhaven.....	First District.
C. W. MITCHELL.....	Aulander.....	Second District.
R. L. WOODARD.....	Pamlico.....	Third District.
CLARENCE POE.....	Raleigh.....	Fourth District.
R. W. SCOTT.....	Haw River.....	Fifth District.
A. T. McCALLUM.....	Red Springs.....	Sixth District.
C. C. WRIGHT.....	Hunting Creek.....	Seventh District.
WILLIAM BLEDSOE.....	Gale.....	Eighth District.
W. J. SHUFORD.....	Hickory.....	Ninth District.
A. CANNON.....	Horse Shoe.....	Tenth District.

Officers and Staff

W. A. GRAHAM.....	Commissioner.
K. W. BARNES.....	Secretary and Purchasing Agent.
MISS SARAH D. JONES.....	Bookkeeper.
D. G. CONN.....	Bulletin Superintendent.
B. W. KILGORE.....	State Chemist, Director Test Farms.
J. M. PICKEL.....	Feed Chemist.
W. G. HAYWOOD.....	Fertilizer Chemist.
J. Q. JACKSON.....	Assistant Chemist.
E. S. DEWAR.....	Assistant Chemist.
D. M. McCARTY.....	Assistant Chemist.
F. C. WIGGINS.....	Assistant Chemist.
J. F. HATCH.....	Fertilizer Clerk.
R. W. COLLETT.....	Assistant Director Test Farms.
H. H. BRIMLEY.....	Curator of Museum.
T. W. ADICKES.....	Assistant Curator.
FRANKLIN SHERMAN, Jr.....	Entomologist.
R. W. LEIBY.....	Assistant Entomologist.
S. C. CLAPP.....	Assistant Entomologist in Field Work.
B. B. FLOWE.....	Veterinarian.
H. P. FLOWE.....	Assistant Veterinarian.
W. N. HUTT.....	Horticulturist.
R. G. HILL.....	Assistant Horticulturist.
B. SZYMONIAK.....	Demonstrator Fruit and Truck Crops.
C. D. MATTHEWS.....	Assistant Horticulturist.
T. B. PARKER.....	Director of Farmers' Institutes.
W. M. ALLEN.....	Chemist and Chief, Division Food and Oil Inspection.
E. W. THORNTON.....	Assistant Chemist, Division Food and Oil Inspection.
C. E. BELL.....	Assistant Chemist, Division Food and Oil Inspection.
LELAND B. RHODES.....	Assistant Chemist, Division Food and Oil Inspection.
C. B. WILLIAMS.....	Chief, Division of Agronomy.
J. K. PLUMMER.....	Soil Chemist.
W. F. PATE.....	Agronomist in Soils.
R. Y. WINTERS.....	Plant Breeding.
*W. E. HEARN.....	State Soil Agent, Soil Survey.
L. L. BRINKLEY.....	Soil Survey.
H. D. LAMBERT.....	Soil Survey.
S. O. PERKINS.....	Soil Survey.
J. L. BURGESS.....	Agronomist and Botanist.
C. H. WALDRON.....	Assistant Botanist and Seed Analyst.
MISS LOUISE A. RADEMACHER.....	Assistant to Botanist.
MISS ALSTON DARGAN.....	Assistant to Botanist.
DAN T. GRAY.....	Chief in Animal Industry.
R. S. CURTIS.....	Associate in Animal Industry.
W. H. EATON.....	Dairy Experimenter.
ALVIN J. REED.....	Dairy Farming.
STANLEY COMBES.....	Assistant in Dairy Farming.
J. A. AREY.....	Assistant in Dairy Farming.
F. R. FARNHAM.....	Assistant in Dairy Farming.
F. T. PEDEN.....	Beef Cattle.
EARL HOSTETLER.....	Assistant in Beef Cattle and Swine.
HA. L. JERDAN.....	Beef Cattle.
HL. E. CASE.....	Assistant in Beef Cattle.
HB. P. FOLK.....	Pig Clubs.
HA. G. OLIVER.....	Poultry Clubs.
HE. H. MATHEWSON.....	T. Raceo Investigations.
HC. R. HUDSON.....	Farm Demonstration Work.
HT. E. BROWN.....	Assistant in Charge of Boys' Clubs.
HA. K. ROBERTSON.....	Assistant in Boys' Clubs.
MISS JANE S. McKIMMON.....	Assistant in Charge Girls' Clubs.
MISS M. L. JAMISON.....	Assistant in Home Economics.

C. E. CLARK, Assistant Director Edgecombe Test Farm, Rocky Mount, N. C.

F. T. MEACHAM, Assistant Director Iredell Test Farm, Statesville, N. C.

JOHN H. JEFFERIES, Assistant Director Pender Test Farm, Willard, N. C.

S. F. DAVIDSON, Assistant Director Buncombe Test Farm, Swannanoa, N. C.

E. G. MOSS, Assistant Director Granville Test Farm, Oxford, N. C.

J. E. DAVIDSON, Assistant Director Transylvania Test Farm, Blantyre, N. C.

*Assigned by the Bureau of Soils, United States Department of Agriculture.

†Assigned by the Bureau of Animal Husbandry, United States Department of Agriculture.

‡In cooperation with Bureau of Plant Industry, United States Department of Agriculture.

LETTER OF TRANSMITTAL

HON. W. A. GRAHAM,

Commissioner of Agriculture.

SIR:—I submit herewith manuscript covering the inspection and analysis of concentrated stock feeds during the past year. I recommend its publication as the November BULLETIN.

Very respectfully,

B. W. KILGORE,

State Chemist.

Approved for printing:

W. A. GRAHAM, *Commissioner.*

NOTE FOR MILLERS

In fixing their guarantees, feed manufacturers must have their feeds analyzed by their own chemists or by public analytical chemists, who are to be found in all the larger cities—Wilmington, Charlotte, Richmond, Norfolk, Charleston, Savannah, Atlanta. The department does not make analyses for manufacturers. Its duty is to go on the markets, take and analyze samples to see if they come up to guarantee. The results of these analyses are reported to feed manufacturers and dealers. Pure wheat and other grains vary in composition from year to year. The various varieties of the same grain vary in analyses. And, accordingly, the by-products, bran, middlings or shorts, shipstuff, vary from season to season in composition. The miller must, therefore, have his products analyzed from time to time, and especially should he do this when he begins to grind a new crop, or a new variety.

COMMERCIAL FEEDS

J. M. PICKEL, FEED CHEMIST
E. S. DEWAR, ASSISTANT*

Five hundred and forty-two (542) samples were analyzed during the year ending mid-summer, 1916; five hundred and thirty-six (536), three hundred and seventy-five (375), three hundred and sixty-three (363) during the corresponding time for 1915, 1914, and 1913, respectively.

One hundred and forty-one (141) samples analyzed this year (1916) were sent in by farmers, dairymen, manufacturers, and other citizens of the State. The remaining samples, 401, were drawn by the official inspector in the principal cities and villages throughout the State. These official samples carried 1,137 guaranties, counting each individual guaranty on protein, fat, and fibre. In 331 instances, or 29 per cent, the feeds were below guaranties, a slight increase (0.5 per cent) over last year. If we include in the estimate only those cases in which the protein was found to be 1 or more per cent below guaranty, fat $1\frac{1}{2}$ per cent or more below, and fiber 1 per cent or more above guaranty, then out of the total of 1,137 guaranties only 167, or 14.7 per cent (an appreciable increase, 2.2 per cent over last year) were not substantially as good as claimed by the manufacturers.

The following table gives a general summary of the kinds of feeds analyzed, the number of each, the number of guaranties of protein, fat, and fiber; the number deficient and the percentage of deficiencies in each kind of feed:


*The proteids were determined by Mr. Dewar, who is engaged only a small part of his time in feed work.

For details of the analyses of each kind of feed, see pages 12 to 55.

IMMEDIATELY ESSENTIAL POINTS OF THE NORTH CAROLINA FEEDING STUFFS LAW

All feeds for live stock and poultry, except hays, straws, and corn stover, when the same are not mixed with other materials, and except the whole seeds or grains of cereals when not mixed with other materials, must be registered and guaranteed; and each bag of such a feed must carry a guarantee tag and tax stamp at the rate of 1 cent per 100 lbs. Instead of a tag, the guarantee may be printed on the bag.

Feeds must be put up in 25 lb., 50 lb., 75 lb., 100 lb. bags. Tax stamps are to be had from the Commissioner of Agriculture in denominations of $\frac{1}{4}$ c., $\frac{1}{2}$ c., $\frac{3}{4}$ c., 1 c., etc.

 (STAMP TO GO HERE)	100 POUNDS WHEAT BRAN MANUFACTURED BY JOHN JONES & CO. RALEIGH, N. C.		GUARANTEED PROTEIN (minimum) .....Per Cent FAT (minimum) .....Per Cent FIBER (maximum) .....Per Cent CARBOHYDRATES .....Per Cent INGREDIENTS <i>Pure Wheat Bran</i>	SPECIMEN GUARANTEE TAG

Mixed Feeds with less than 9 per cent protein are not permitted; 10 per cent protein is the minimum permitted in mixed feeds containing such low grade ingredients as cotton seed hulls, peanut hulls, corn cob, straw, oat hulls.

Each Ingredient of a feed must be stated specifically by its name.

Screenings must be ground to destroy the viability of weed seeds.

Cotton-seed Meal must contain not less than 38.6 per cent of protein, equivalent to 7.5 per cent ammonia. Mixtures of meal and hulls containing less than the above must be sold as cotton-seed feed or under a name not containing the word meal.

Penalties.—Persons violating the law are subject to a fine of \$50 to \$200 for each offense, and feeds which do not meet the requirements are subject to seizure, condemnation, and sale.

Copies of the law may be had on application.

HEARINGS

When a sample of commercial feed examined shows variation from the guarantees, the dealer or manufacturer from whom the sample was

taken shall be given an opportunity to be heard in his defense by the Commissioner before the facts may be certified to the proper prosecuting attorney.

It is the duty of the Department of Agriculture to regularly inspect the feeds offered for sale in the State and to see that all feeds bear the tax stamp and are properly labeled. The Department is required to collect and analyze at least one sample of every brand of feed found on sale in the State during the year and to publish the results for the benefit of those interested in this class of goods.

The Department will be glad, at any time, to furnish information regarding the character and value of any class of feed.

DEFINITIONS ESPECIALLY IMPORTANT TO MILLERS

The Association of Feed Control Officials in coöperation with The American Feed Manufacturers' Association has adopted definitions for almost all varieties of feeding stuffs. If all manufacturers would follow these definitions in naming their products, much confusion and misunderstanding would be avoided. A few of these definitions of special interest to millers are subjoined:

Wheat Bran is the coarse outer coatings of the wheat berry obtained in the usual commercial milling process from wheat that has been cleaned and scoured.

Shorts or Standard Middlings are the fine particles of the outer and inner bran separated from bran and white middlings.

Wheat White Middlings or White Middlings are that part of the offal of wheat intermediate between shorts or standard middlings and red dog.

Shipstuff or Wheat Mixed Feed is a mixture of the products other than the flour obtained from the milling of the wheat berry.

Red Rog is a low grade wheat flour containing the finer particles of bran.

Wheat Bran with Mill Run Screenings is pure wheat bran plus the screenings which were separated from the wheat used in preparing said bran.

Wheat Bran with Screenings not Exceeding Mill Run is either wheat bran with the whole mill run of screenings or wheat bran with a portion of the mill run of screenings, provided that such portion is not an inferior portion thereof.

Meal is the clean, sound, ground product of the entire grain, cereal or seed which it purports to represent.

Chop is a ground or chop feed composed of one or more different cereals or by-products thereof. If it bears a name descriptive of the kind of cereals, it must be made exclusively of the entire grains of those cereals.

Screenings are the smaller imperfect grains, weed seeds and other foreign material having feeding value, separated in cleaning the grain.

Cottonseed Feed. All mixtures of cottonseed meal and hulls containing less than 38.62 per cent protein shall be branded Cottonseed Feed, or a name may be given which does not contain the word "meal" or any other word that might be misleading.

Millers are especially requested to note:

(1) That *Shipstuff* is a pure wheat product.

(2) That *Shorts* and *Middlings* are the same thing.

(3) That when *Screenings* are run in with bran, middlings, shipstuff, the resulting product is no longer bran, middlings, or shipstuff, and should not be so designated; but is a *mixture*, and should be designated so as to make that clear, thus: Wheat Bran and Screenings, Shipstuff and Screenings, or Wheat Bran with Mill Run Screenings, Wheat Bran with Screenings, not exceeding Mill Run.

(4) That *Screenings* should always be ground to destroy the viability of weed seeds. Weed seeds are usually so small and so hard that they pass through the alimentary canal undigested and become disseminated in dung over the fields to the detriment of both farmer and miller.

TERMS USED IN ANALYSIS

Ash. This is the incombustible part of the plant, earthy matter drawn from the soil by the plants, and taken over into the animal organism from plants.

Protein. This is the nitrogenous portion of the plant. Lean meat, white of eggs, curd of milk, gluten of grain are examples.

Fiber. The frame-work of the plant; trunk and stem are hardened fiber mixed with mineral and other matter; cotton is almost pure fiber.

Fat. The portion of plant soluble in ether is classed as fat, but includes small quantity of substances other than fats. Cotton-seed oil, olive oil, peanut oil, the oils of cereals are examples. Tallow, lard, butter and the various animal oils and fats fall into this class.

Nitrogen-free Extract. Starch, the various sugars, gums are examples.

Carbohydrates. This is a general term, including fiber and nitrogen-free extract.

ANIMAL FEEDING AND NUTRITION

A fundamental distinction between plants and animals is this: Plants manufacture, so to speak, foods; animals consume, but cannot manufacture, food. They merely transform—more or less modify—the food they get from plants, utilize it for their own growth and maintenance and for doing work, or else store it up in their bodies or, as in the case of milk, excrete it.

Animals get the mineral matter for forming bone from plants, a small portion also from water. The function of the carbohydrates and fats in animal nutrition is the production of warmth and energy; for this purpose fat has two and four-tenths the value of carbohydrate pound for

pound. The function of protein is to build up, repair and sustain the vital portions of the animal organism—blood, muscle, nerve, brain; the fats and carbohydrates cannot do this. Protein is capable also of being oxidized, or burned, in the body and producing warmth and energy; and in the absence of adequate fats and carbohydrates is thus utilized; but this is, besides being extravagant, unwholesome. A well balanced ration is one that contains protein, fat, carbohydrate in proper proportion to meet the needs of the animal. These needs vary with the kind of animal, its age and uses.

The following are excellent hand-books on animal feeding and nutrition:—

“Feeds and Feeding” by Henry and Morrison; “Profitable Stock Feeding” by Prof. H. W. Smith; “Manual of Cattle Feeding,” by Prof. H. P. Annsby; “The Feeding of Animals” by W. H. Jordan.

ANALYSES OF SAMPLES

WHEAT BRAN, WHEAT

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price of Package
1041	Ballard's Bran.....	Ballard & Ballard, Louisville, Ky.	E. P. Nash, Elizabeth City	Mar. 27, '16	100	\$1.50
844	do.....	do.....	W. S. White & Co., Elizabeth City	Dec. 13, '15	100	1.50
672	do.....	do.....	Edwards & Harper, Kinston	Jan. 14, '16	100	1.60
852	do.....	do.....	C. G. Morris, Washington	Dec. 15, '15	100	1.60
944	Wheat Bran.....	Biltmore Milling Co., Biltmore, N. C.	L. R. Strecker, Asheville...	Feb. 17, '16	75	1.25
900	Pure Wheat Bran.....	Dan Valley Mills, Danville, Va.	A. G. Bowman, Mt. Airy...	Mar. 1, '16	100	1.50
719	Wheat Bran and Screen- ings.	Dunlop Milling Co., Clarksville, Tenn.	Adams Grain & Produce Co., Asheville.	July 16, '15	75	1.30
716	do.....	do.....	Asheville Grocery Co., Asheville.	July 16, '15	75	1.30
873	do.....	do.....	M. T. Best & Sons, Goldsboro.	Jan. 11, '16	100	1.50
1003	do.....	do.....	C. L. Spencer, New Bern.	Mar. 10, '16	100	1.65
1035	do.....	do.....	E. H. & M. V. Lawrence, Durham.	Mar. 29, '16	100	1.50
817	Dunlop Wheat Bran.....	Dunlop Mills, Richmond, Va.	Mathews-Weeks Co., Rocky Mount.	Dec. 8, '15	100	1.60
860	Wheat Bran.....	do.....	C. A. Dawson & Bro., Kinston.	Jan. 14, '16	100	1.65
1038	Arrow Wheat Bran.....	do.....	R. B. Peters Grocery Co., Tarboro.	Mar. 24, '16	100	1.50
7155	Wheat Bran.....	Graham Milling Co., Graham, N. C.	R. L. Clapp & Bro., Graham.	Mar. 21, '16	75	1.35
710	Pure Wheat Bran and Screenings.	Liberty Mills, Nashville, Tenn.	Mount Airy Feed Store, Mount Airy.	July 9, '15	100	1.60
702	do.....	do.....	G. C. Lovill & Co., Mount Airy.	July 9, '15	100	1.50
725	do.....	do.....	Byers Bros., Henderson- ville.	July 17, '15	75	1.35
767	do.....	do.....	Winston Grain Co., Winston-Salem.	Nov. 3, '15	100	1.60
758	do.....	do.....	Farmers' Union Agency, Winston-Salem.	Nov. 8, '15	100	1.50
7839	do.....	do.....	Charles Moody & Co., Charlotte.	Nov. 10, '15	100	1.60
7799	do.....	do.....	Farmers' Supply Co., Charlotte.	Nov. 10, '15	75	1.25
981	do.....	Washburn-Crosby Minneapolis, Minn.	S. W. Y. Supply Co., Elkin.	Mar. 1, '16	100	1.60
793	do.....	Liberty Mills, Nashville, Tenn.	Cromer Bros., Winston- Salem.	Nov. 26, '15	100	1.50
860	do.....	do.....	Hoge & Stewart, Winston- Salem.	Jan. 1, '16	100	1.45
954	do.....	do.....	Parker & Clark, High Point.	Feb. 21, '16	100	1.60

OF FEEDS, SEASON 1915-1916

BRAN WITH SCREENINGS

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
1041	Guaranteed...	14.5	...	4.1	...	9.6	...	
	Found.....	14.0	-.5	4.5	.1	8.9	-.7	Wheat bran.
844	Guaranteed...	...	...	...	...	...	...
	Found.....	15.0	.5	5.3	1.2	9.2	.2	do.
672	Guaranteed...	...	...	...	...	...	...
	Found.....	15.1	.1	4.6	.5	9.2	.2	do.
832	Guaranteed...	...	...	...	...	...	...
	Found.....	17.6	2.5	4.5	.5	9.0	.0	do.
944	Guaranteed...	11.5	...	4.0	...	8.0	...	
	Found.....	16.2	4.7	4.6	.6	8.9	.9	Pure wheat products.
990	Guaranteed...	11.5	...	4.0	...	9.5	...	
	Found.....	13.5	+ 1.0	4.2	.3	10.3	.8	Pure wheat bran.
719	Guaranteed...	11.8	...	4.0	...	9.5	...	
	Found.....	15.3	0.5	4.1	.1	7.5	- 2.0	Wheat bran and screenings.
716	Guaranteed...	...	...	...	...	...	...
	Found.....	15.4	0.6	4.4	.4	6.9	- 2.6	do.
873	Guaranteed...	...	...	...	...	...	...
	Found.....	16.7	1.9	4.2	.2	8.5	- 1.0	do.
1003	Guaranteed...	...	...	...	...	...	...
	Found.....	16.8	2.0	3.9	.1	7.1	- 2.1	do.
1055	Guaranteed...	...	...	...	...	...	...
	Found.....	16.8	2.0	4.0	.0	7.6	- 2.1	do.
817	Guaranteed...	11.5	...	4.0	...	9.5	...	
	Found.....	15.8	4.3	4.6	.6	7.9	- 1.6	Wheat bran.
866	Guaranteed...	...	...	...	...	...	...
	Found.....	15.3	.8	4.6	.3	7.1	- 2.1	do.
1038	Guaranteed...	14.5	...	4.0	...	11.0	...	
	Found.....	14.1	-.4	4.2	.2	7.8	- 3.2	do.
7155	Guaranteed...	11.7	...	5.9	...	9.4	...	
	Found.....	15.8	4.1	4.5	- 1.4	7.6	- 1.8	do.
710	Guaranteed...	14.5	...	4.0	...	9.5	...	
	Found.....	14.9	.4	4.6	.6	9.0	-.5	Wheat bran and screenings.
702	Guaranteed...	...	...	...	...	...	...
	Found.....	14.4	.1	4.4	.1	8.7	-.8	do.
725	Guaranteed...	...	...	...	...	...	...
	Found.....	15.3	.8	4.0	.0	8.6	-.9	do.
767	Guaranteed...	...	...	...	...	...	...
	Found.....	16.1	1.5	4.2	.2	7.1	- 2.4	do.
758	Guaranteed...	...	...	...	...	...	...
	Found.....	16.1	...	3.9	-.1	8.5	- 1.0	do.
783	Guaranteed...	...	...	...	...	...	...
	Found.....	15.3	.8	4.9	.9	7.6	- 1.9	do.
779	Guaranteed...	...	...	...	...	...	...
	Found.....	14.6	.1	4.4	.4	7.9	- 1.6	do.
981	Guaranteed...	14.5	...	4.0	...	12.0	...	
	Found.....	13.2	-.13	5.4	1.1	10.9	- 1.1	do.
793	Guaranteed...	14.5	...	4.0	...	9.5	...	
	Found.....	17.4	2.9	4.4	.4	9.8	.3	do.
860	Guaranteed...	...	...	...	...	...	...
	Found.....	16.1	1.6	4.7	.7	8.5	- 1.0	do.
954	Guaranteed...	...	...	...	...	...	...
	Found.....	13.2	- 1.3	4.0	...	8.9	-.6	do.

WHEAT BRAN, WHEAT

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price of Package
983	Pure Wheat Bran and Screenings.	Liberty Mills, Nashville, Tenn.	G. C. Lovell Co., Mount Airy.	Mar. 1, '16	100	\$1.40
991	do.	do.	A. G. Bowman, Mount Airy.	Mar. 1, '16	100	1.50
987	do.	do.	The West-Hill Co., Mount Airy.	Mar. 1, '16	100	1.40
1021	do.	do.	D. L. Gore Co., Wilmington.	Mar. 14, '16	100	1.40
1057	do.	do.	E. H. & M. V. Lawrence, Durham.	Mar. 29, '16	100	1.60
973	Wright's Choice Wheat Bran.	Lindsey Robinson & Co., Roanoke, Va.	Williams & Snow, Elkin	Feb. 28, '16	100	1.60
790	Wheat Bran and Screenings.	Louisville Milling, Louisville, Ky.	S. W. Y. Supply Co., Elkin.	Nov. 23, '15	100	1.65
980	do.	do.	Elkin Roller Mills, Elkin	Feb. 28, '16	100	1.60
1016	Pure Wheat Bran.	Model Mill Co., Johnson City, Tenn.	John S. McEachern Sons, Wilmington.	Mar. 13, '16	100	1.45
1012	do.	do.	J. W. Brooks, Wilmington.	Mar. 13, '16	100	1.45
1029	do.	do.	B. F. Mitchell Co., Wilmington.	Mar. 14, '16	100	1.40
712	do.	Mountain City Mill Co., Mountain City, Tenn.	J. E. Sloop, Statesville.	July 21, '15	100	1.75
978	do.	do.	Elkin Roller Mills, Elkin	Feb. 28, '16	100	1.60
796	Wheat Bran.	Morristown Flour Mills, Morristown, Tenn.	Asheville Grocery Co., Asheville	Nov. 29, '15	75	1.30
706	Wheat Bran and Screenings.	Pillsbury Mills, Minneapolis, Minn.	The West Hill Co., Mount Airy.	July 9, '15	100	1.60
818	Pillsbury Wheat Bran.	do.	Matthew-Weeks Co., Rocky Mount.	Dec. 8, '15	100	1.60
861	Wheat Bran.	Southside Roller Mills, Winston-Salem.	Sink & Love, Winston-Salem.	Jan. 11, '16	100	1.50
745	do.	W. A. Watson & Co., Greensboro, N. C.	Elmore Maxwell Co., Greensboro.	Nov. 2, '15	100	1.60
905	do.	Morristown Flour Mills, Morristown, Tenn.	City Feed Co., Hickory.	Feb. 8, '16	75	1.30

RECAPITU

Wheat Bran With and Without Screenings

Guaranteed	.....
Found	.....
Deficient*	.....
Range of deficiency	.....
Range of excess	.....
Average deficiency	.....
Average excess	.....

*Deficient means below guarantee. In the case of fiber fiber is a diluent.

BRAN WITH SCREENINGS—Continued

Laboratory Number	Guaranteed and Found	Protein, Per cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
983	Guaranteed.....							
	Found.....	13.7	— .8	4.3	.3	10.3	.8	Wheat bran and screenings.
991	Guaranteed.....							
	Found.....	13.8	— .7	4.5	.5	10.2	.7	do.
987	Guaranteed.....							
	Found.....	14.2	— .3	4.1	.1	8.8	— .7	do.
1021	Guaranteed.....							
	Found.....	16.0	1.5	4.4	.4	7.9	— 1.6	do.
1057	Guaranteed.....							
	Found.....	14.8	.3	4.1	.1	7.9	— 1.6	do.
973	Guaranteed.....							
	Found.....	14.3		5.0		9.4		do.
790	Guaranteed.....							
	Found.....	14.5		4.9		9.5		
	Found.....	15.1	.9	4.3	.3	9.6	.1	Wheat bran with ground screenings.
980	Guaranteed.....							
	Found.....	14.7	.2	4.0		9.9	.4	do.
1016	Guaranteed.....							
	Found.....	15.0		4.0		9.0		
	Found.....	14.1	— .9	4.3	.3	9.2	.2	Pure wheat bran.
1012	Guaranteed.....							
	Found.....	14.8	.2	4.2	.2	9.2	.2	do.
1029	Guaranteed.....							
	Found.....	15.5	.5	4.3	.3	8.1	— .9	do.
712	Guaranteed.....							
	Found.....	14.5		4.0		9.5		
	Found.....	15.0	.5	4.3	.3	7.6	— 1.9	do.
978	Guaranteed.....							
	Found.....	14.5		4.1	.1	6.0	— 3.5	do.
796	Guaranteed.....							
	Found.....	14.5		4.0		9.5		
	Found.....	16.0	1.5	4.4	.4	8.6	— 0.9	Pure wheat products.
706	Guaranteed.....							
	Found.....	14.5		4.0		12.0		
	Found.....	14.8	.3	4.4	.1	10.9	— 1.1	Wheat bran and screenings.
818	Guaranteed.....							
	Found.....	14.5		4.0		12.0		
	Found.....	18.0	3.5	4.1	.1	9.2	— 2.8	do.
861	Guaranteed.....							
	Found.....	14.5		4.0		6.5		
	Found.....	15.7	1.2	4.6	.6	9.2	2.7	do.
745	Guaranteed.....							
	Found.....	14.5		4.0		9.5		
	Found.....	15.8	1.3	4.4	.4	9.2	.3	do.
905	Guaranteed.....							
	Found.....	14.5		4.0		9.5		
	Found.....	15.7	1.2	4.3	.3	8.5	— 1.0	Pure wheat products.

LATION

Protein	Fat	Fiber
14.5% to 15.0%	4.0% to 5.9%	6.5% to 12.0%
13.2% to 18.0%	3.9% to 5.4%	6.0% to 10.9%
10 or 22.0%	3 or 7.0%	28 or 62.0%
0.4% to 1.3%	0.1% to 1.4%	0.1% to 3.5%
0.1% to 3.5%	0.1% to 1.4%	0.1% to 2.7%

to be below guarantee is to be better than guarantee, since

WHEAT MIDLINGS OR SHORTS WITH

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package—Lbs.	Price of Package
947	Brown Middlings	Biltmore Milling Co., Biltmore, N. C.	L. R. Streecker, Asheville...	Feb. 17, '16	75	\$1.25
1031	Crown Wheat Standard Middlings.	Bingham & Co., Rich- mond, Va.	L. M. Savage, Greenville	Mar. 22, '16	100	1.75
1067	do.....	do.....	Littleton Feed and Gro- cery Co., Littleton.	Apr. 12, '11	100	1.50
843	Standard Middlings.....	Crescent Milling Co., Fairfax, Minn.	W. S. White & Co., Elizabeth City.	Dec. 13, '15	100	1.50
746	Middlings and Screenings	Colton Bros. Co., Bell Fountain, O.	W. H. Turner, Winston- Salem.	Nov. 3, '15	100	1.75
967	Wheat Shorts.....	Cairo Milling Co., Cairo, Ill.	S. V. Tomlinson, North Wilkesboro.	Feb. 28, '16	100	1.50
826	Pure Wheat Bran Middlings.	Dunlop Milling Co., Clarksville, Tenn.	Geo. S. Edwards & Co., Rocky Mount.	Dec. 8, '15	100	1.75
821	do.....	do.....	Matthews, Weeks & Co., Rocky Mount.	Dec. 8, '15	100	1.60
931	do.....	do.....	Adams Grain and Provision Co., Asheville.	Feb. 10, '16	75	1.35
924	do.....	do.....	J. D. Earle Feed Co., Asheville.	Feb. 10, '16	75	1.30
1009	do.....	do.....	Armstrong Grocery Co., New Bern.	Mar. 10, '16	100	.....
774	Wheat Middlings	Graham Milling Co., Graham, N. C.	A. W. Norwood, Graham...	Nov. 9, '15	75	1.30
7151	do.....	do.....	R. L. Clapp & Bro., Graham.	Mar. 21, '16	75	1.50
7153	Pure Shorts	do.....	A. W. Norwood, Graham	Mar. 21, '16	75	1.50
1004	Pure Wheat Middlings or Shorts.	Igleheart Bros., Evans- ville, Ind.	C. L. Spencer, New Bern...	Mar. 10, '16	100	1.75
952	Tiger Middlings.....	Lindsey Robinson & Co., Roanoke, Va.	Williams & Snow, Elkin...	Feb. 28, '16	100	1.85
960	Pure Wheat Shorts	Liberty Mills, Nashville, Tenn.	Parker & Clark, High Point.	Feb. 21, '16	100	1.75
7103	do.....	do.....	Raleigh Grain & Milling Co., Raleigh.	Feb. 12, '16	100	1.50
1090	Pure Wheat Middlings.	J. D. Manor & Co., New Market, Va.	E. H. & M. V. Lawrence, Durham.	Mar. 29, '16	100	1.60
1031	Wheat Shorts and Screen- ings	Marshall Milling Co., Marshall, Minn.	J. B. Johnson, Greenville	Mar. 22, '16	100	1.60
789	Pure Wheat Shorts	Middle Tenn. Milling Co., Tullahoma, Tenn.	Piedmont Feed Co., North Wilkesboro.	Nov. 22, '15	100	1.80
7106	Rich Middlings	Model Mills Co., Johnson City, Tenn.	Raleigh Grain & Milling Co., Raleigh.	Feb. 2, '16	100	1.50
7113	do.....	do.....	C. B. Gill & Co., Raleigh	Feb. 17, '16	100	*
7112	do.....	do.....	do.....	Feb. 17, '16	100	*
7110	do.....	do.....	W. A. Myatt, Raleigh	Feb. 17, '16	100	1.65
911	do.....	do.....	J. D. Earle Feed Co., Asheville.	Feb. 10, '16	75	1.35
926	do.....	do.....	Slayden Fakes Co., Asheville.	Feb. 11, '16	75	1.15

AND WITHOUT SCREENINGS

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
945	Guaranteed.....	15.0		4.0		6.0		1.1 Pure wheat products
	Found.....	15.9	.9	4.7	.7	4.9	-.1	
1031	Guaranteed.....	15.0		4.0		9.5		2.0 Middlings and mill run screenings.
	Found.....	15.1	.1	5.1	1.1	7.5	-.2	
1067	Guaranteed.....							do.
	Found.....	15.1	.1	5.1	1.1	8.9	.6	
843	Guaranteed.....	15.8		3.8		10.0		do.
	Found.....	16.0	.2	4.4	.6	8.1	1.6	
746	Guaranteed.....	16.0		4.5		6.0		.5 Middlings and screenings
	Found.....	16.9	.9	4.6	.1	5.5	-.5	
967	Guaranteed.....	16.0		4.0		9.0		do.
	Found.....	15.9	-.1	3.7	-.3	8.0	-1.0	
826	Guaranteed.....	16.3		4.6		6.6		Made from pure wheat.
	Found.....	16.9	.6	4.0	-.6	5.3	-1.3	
821	Guaranteed.....							do.
	Found.....	17.7	1.4	4.4	-.2	4.6	-2.0	
931	Guaranteed.....							do.
	Found.....	16.3		3.8	.8	4.8	-1.8	
924	Guaranteed.....							do.
	Found.....	17.3	1.0	4.1	.5	5.0	-1.6	
1009	Guaranteed.....							do.
	Found.....	17.6	1.3	4.9	.3	5.2	-1.1	
774	Guaranteed.....	16.8		5.9		4.8		Wheat middlings. Contains corn products
	Found.....	13.3	3.5	4.2	-1.7	2.8	-2.0	
7154	Guaranteed.....							do.
	Found.....	14.9	1.9	1.1	1.8	3.0	-1.8	
7153	Guaranteed.....							do.
	Found.....	14.6	2.2	3.9	-2.0	2.5	-2.3	
1001	Guaranteed.....	15.0		4.0		6.0		1.3 Wheat middlings and ground screenings.
	Found.....	15.2	.2	2.7	-1.3	4.7	-1.3	
972	Guaranteed.....	17.0		4.5		1.0		1.5 Middlings.
	Found.....	16.5	-.5	4.7	.2	2.5	-1.5	
960	Guaranteed.....	16.0		4.0		6.0		Made from pure wheat only.
	Found.....	16.6	.6	4.1	.1	4.3	-1.7	
7103	Guaranteed.....							do.
	Found.....	14.8	1.2	3.5	.5	4.6	-1.4	
1060	Guaranteed.....	16.3		5.0		4.0		1.2 Pure wheat middlings.
	Found.....	16.5	.2	5.1	.1	5.2	-1.2	
1034	Guaranteed.....	17.0		5.0		9.4		1.6 Wheat shorts and screenings
	Found.....	15.3	1.7	5.0		7.8	-1.6	
780	Guaranteed.....	16.0		4.6		6.6		Made from wheat only.
	Found.....	15.5	-.5	4.3	.3	3.3	-2.7	
7106	Guaranteed.....	15.6		4.0		7.2		Wheat middlings, wheat shorts, wheat offals
	Found.....	15.1	.1	4.4	.4	7.1	-.1	
7113	Guaranteed.....							do.
	Found.....	15.4	.4	4.4	.4	6.3	-.9	
7112	Guaranteed.....							do.
	Found.....	14.9	-.1	4.5	.5	6.4	-.8	
7110	Guaranteed.....							do.
	Found.....	14.8	.2	4.4	.4	6.6	-.6	
914	Guaranteed.....							do.
	Found.....	15.3	.3	4.4	.4	6.6	-.6	
936	Guaranteed.....							do.
	Found.....	15.0		4.4	.4	6.3	-.9	

WHEAT MIDLINGS OR SHORTS WITH

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price of Package
927	Rich Middlings.....	Model Mills Co., Johnson City, Tenn.	Adams Grain & Produce Co., Asheville.	Feb. 14, '16	75	\$1.35
1045	do.....	do.....	H. C. Privatt, Edenton...	Mar. 28, '16	100	1.70
1059	do.....	do.....	E. H. & M. V. Lawrence, Durham.	Mar. 29, '16	100	1.60
1019	Wheat Middlings.....	Northwestern Consolidated Milling Co., Minneapolis, Minn.	John S. McEachern & Sons, Wilmington.	Mar. 13, '16	100	1.60
837	Brown Middlings.....	Pillsbury Mills, Minneapolis, Minn.	T. P. Marsh, Elizabeth City.	Dec. 13, '15	100	1.50
832	do.....	do.....	W. J. Hodges, Williams- ton.		100	1.75
877	do.....	do.....	B. G. Thompson & Son, Goldsboro.	Jan. 14, '16	100	1.50
875	Pillsbury's Middlings.....	do.....	M. G. Best & Sons, Goldsboro.	Jan. 14, '16	100	1.50
1068	Pillsbury's Standard Middlings.....	do.....	Littleton Feed & Grocery Co., Littleton.	Apr. 12, '16	100	1.50
1033	do.....	do.....	J. B. Johnson, Greenville...	Mar. 22, '16	100	1.60
865	Wheat Standard Middlings.....	do.....	C. A. Dawson & Bro., Kinston.	Jan. 14, '16	100	1.65
853	Standard Middlings.....	do.....	C. G. Morris, Washington	Dec. 15, '15	100	1.65
803	Standard Wheat Middlings.....	do.....	R. Hope Brinson & Co., Gastonia.	Nov. 30, '15	75	1.30
785	do.....	do.....	Charles Moody Co., Charlotte.		75	1.25
995	Daisy Middlings.....	do.....	W. B. Haymore, Mount Airy.	Mar. 1, '16	100	1.90
992	do.....	do.....	A. G. Bowman, Mount Airy.	Mar. 1, '16	100	1.90
982	do.....	do.....	G. C. Lovell, Mount Airy	Mar. 1, '16	100	1.85
989	do.....	do.....	The West-Hill Co., Mount Airy.	Mar. 1, '16	100	1.90
777	Daisy XX Middlings.....	do.....	Merchants Supply Co., Burlington.	Nov. 9, '15	100	1.85
792	do.....	do.....	S. W. Y. Supply Co., Elkin.	Nov. 23, '15	100	1.90
812	do.....	do.....	W. D. Holland, Dunn.	Dec. 7, '15	100	2.00
1035	do.....	do.....	R. B. Peters, Grocery Co., Tarboro.	Mar. 21, '16	100	1.90
751	do.....	do.....	Winston Grain Co., Winston-Salem.	Nov. 3, '15	100	1.75
790	do.....	do.....	W. B. Haymore, Mount Airy.	July 9, '15	100	2.10
750	do.....	do.....	W. H. Turner, Winston-Salem.	Nov. 3, '15	100	1.80
900	Pure Wheat Middlings.....	Stuart's Draft Milling Co., Stuart's Draft, Va.	City Feed Co., Hickory...	Feb. 28, '16	100	2.00
1051	Star Wheat Middlings.....	J. A. Tate & Co., Richmond, Va.	E. H. & M. V. Lawrence, Durham	Mar. 29, '16	100	1.60

AND WITHOUT SCREENINGS—Continued

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
927	Guaranteed.....	.....	.....	.....	.....	.....	.....	Wheat middlings, wheat shorts, wheat offals
	Found.....	15.2	.2	4.4	.4	6.4	1.1	
1045	Guaranteed.....	.....	.....	.....	.....	.....	.....	do.
	Found.....	14.3	.7	4.2	.2	6.9	.3	
1059	Guaranteed.....	.....	.....	.....	.....	.....	.....	do.
	Found.....	15.5	.5	4.2	.2	6.6	.6	
1019	Guaranteed.....	15.0		4.5		11.0		Wheat middlings.
	Found.....	16.3	1.3	6.7	2.2	8.3	2.7	
837	Guaranteed.....	15.0		4.0		9.0		Wheat middlings with screenings.
	Found.....	15.0		5.5	1.5	9.4	0.4	
832	Guaranteed.....	15.0		5.0		5.0		do.
	Found.....	16.6	1.6	5.5	.5	7.8	2.8	
877	Guaranteed.....	15.0		4.5		10.0		do.
	Found.....	15.2	.2	5.8	.3	8.2	1.8	
875	Guaranteed.....	12.5		4.0		11.0		do.
	Found.....	15.0	2.5	6.9	2.9	9.6	1.4	
1068	Guaranteed.....	14.0		4.0		11.0		do.
	Found.....	14.3	.3	5.1	1.1	9.3	1.7	
1033	Guaranteed.....	15.0		4.5		10.0		do.
	Found.....	15.4	.4	5.6	1.1	8.3	1.7	
865	Guaranteed.....	15.0		4.0		10.0		do.
	Found.....	15.8	.8	6.2	2.2	8.9	1.1	
853	Guaranteed.....	15.0		5.0		9.5		do.
	Found.....	15.5	.5	5.4	.4	7.6	1.9	
803	Guaranteed.....	15.0		4.5		10.0		do.
	Found.....	15.0		6.3	.8	9.7	1.3	
785	Guaranteed.....	.....	.....	.....	.....	.....	.....	do.
	Found.....	14.8	.2	6.4	1.9	8.9	1.1	
995	Guaranteed.....	16.0		4.0		4.0		Middlings.
	Found.....	16.6	.6	4.7	.7	2.2	1.8	
992	Guaranteed.....	.....	.....	.....	.....	.....	.....	do.
	Found.....	15.9	.1	3.8	.2	1.8	2.2	
982	Guaranteed.....	.....	.....	.....	.....	.....	.....	do.
	Found.....	16.7	.7	3.9	.1	2.3	1.7	
989	Guaranteed.....	.....	.....	.....	.....	.....	.....	do.
	Found.....	16.3	.3	4.0	...	1.8	2.2	
777	Guaranteed.....	17.0		4.0		4.0		Low grade wheat flours
	Found.....	16.4	.6	5.5	1.5	1.7	2.3	
792	Guaranteed.....	.....	.....	.....	.....	.....	.....	do.
	Found.....	17.0	...	4.9	.5	2.1	1.9	
812	Guaranteed.....	.....	.....	.....	.....	.....	.....	do.
	Found.....	17.5	.5	3.9	.1	2.1	1.9	
1035	Guaranteed.....	.....	.....	.....	.....	.....	.....	do.
	Found.....	17.1	.1	4.5	.5	2.0	2.0	
734	Guaranteed.....	.....	.....	.....	.....	.....	.....	do.
	Found.....	16.9	.1	4.9	.5	2.0	2.0	
700	Guaranteed.....	.....	.....	.....	.....	.....	.....	do.
	Found.....	19.5	2.3	4.4	.4	2.4	1.6	
750	Guaranteed.....	.....	.....	.....	.....	.....	.....	do.
	Found.....	17.4	.4	4.8	.8	2.1	1.9	
906	Guaranteed.....	15.0		4.0		4.0		Pure wheat product
	Found.....	12.7	2.3	2.8	1.2	1.4	2.6	
1054	Guaranteed.....	15.0		5.0		9.5		Wheat middlings.
	Found.....	15.7	.7	5.1	.1	7.1	2.4	

WHEAT MIDLINGS OR SHORTS WITH

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price of Package
74	Middlings with Screen- ings.	Washburn-Crosby Co., Minneapolis, Minn.	W. H. Turner, Winston- Salem	Nov. 3, '15	100	\$1.65
795	do.	do.	Cramer Bros. & Co., Winston-Salem.	Nov. 26, '15	100	1.60
815	do.	do.	Matthews-Weeks & Co., Rocky Mount.	Dec. 8, '15	100	1.60
965	do.	do.	Parker & Clark, High Point.	Feb. 21, '16	100	1.75
1042	do.	do.	F. P. Nash, Elizabeth City.	Mar. 27, '16	100	1.50
757	Pure Wheat Shorts.	Southern Milling Co., Nashville, Tenn.	Farmers' Union Agency, Winston-Salem.	Nov. 8, '15	100	1.65

RECAPITU

Wheat Middlings, or Shorts, With and Without Screenings

Guaranteed.....
 Found.....
 Deficient.....
 Range of deficiency.....
 Range of excess.....
 Average deficiency.....
 Average excess.....

AND WITHOUT SCREENINGS—Continued

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
71	Guaranteed	15.0		5.0		9.5		Middlings with ground screenings, not exceeding 1 mill run.
	Found	16.0	+ 1.0	6.3	+ 1.3	7.1	- 2.4	
795	Guaranteed	16.0		5.0		8.6		do.
	Found	16.0		5.0		8.6		
815	Guaranteed	15.3		5.3		6.4		do.
	Found	15.3		5.3		6.4		
963	Guaranteed	15.1		5.0		6.7		do.
	Found	15.1		5.0		6.7		
1011	Guaranteed	14.6		4.6		10.0		do.
	Found	15.1	+ 0.5	5.0	+ 0.4	7.7	- 2.3	
757	Guaranteed	16.0		4.0		6.0		do.
	Found	15.5	- 0.5	3.5	- 0.5	5.8	- 0.2	

LATION

Protein	Fat	Fiber
12.5% to 17.0%	3.8% to 5.9%	4.0% to 11.0%
12.7% to 19.3%	2.7% to 6.9%	1.1% to 9.7%
16 or 27.0%	13 or 22.0%	56 or 93.0%
0.1% to 2.3%	0.1% to 2.0%	0.1% to 3.1%
0.1% to 3.5%	0.1% to 2.9%	0.4% to 2.8%

WHEAT BRAN AND MIDDINGS OR SHORTS

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of package—Lbs.	Price of Package
714	Bran and Shorts.....	City Flour Mills, Statesville, N. C.	J. E. Sloop, Statesville..	July 21, '15	77	1.35
979	do.....	do.....	Elkin Roller Mill, Elkin..	Feb. 28, '16	75	1.35
7211	do.....	China Grove Milling Co., China Grove, N. C.	China Grove Milling Co., China Grove.	June 30, '15	100	1.50
879	do.....	Grimes Milling Co., Salisbury, N. C.	H. Z. White, Salisbury.....	Jan. 24, '16	75	1.30
888	do.....	Newport Mills, Newport, Tenn.	Overman & Co., Salisbury	Jan. 24, '16	75	1.30
804	do.....	do.....	Adams Grain & Provision Co., Charlotte.	Nov. 30, '15	75	1.30
798	do.....	do.....	Asheville Grocery Co., Asheville.	Nov. 29, '15	75	1.40
786	do.....	Summerfield Milling Co., Summerfield, N. C.	City Grocery Co., Madison.	Nov. 12, '15	100	1.45
778	do.....	Larabee Mills Co., Hutchinson, Mo.	Johnston Bros., Charlotte	Nov. 10, '15	75	1.25
827	Thoroughbred Feed.....	Lexington Roller Mills Co., Inc., Lexington, Ky.	Geo. S. Edwards & Co., Rocky Mount.	Dec. 8, '15	100	1.75
870	do.....	do.....	Edwards & Harper, Kinston.	Jan. 14, '16	100	1.65
1010	do.....	do.....	Armstrong Grocery Co., New Bern.	Mar. 10, '16	100	.....
996	Champion Mill Feed.....	Mount Ulla Roller Mill Co., N. C.	W. M. Neel & Co., Mooreville.	Mar. 4, '16	100	1.60
805	Red Band Mixed Feed.....	Columbia Grain Co., Nashville, Tenn.	Adams Grain & Provision Co., Charlotte.	Nov. 30, '15	75	1.35
961	do.....	do.....	Parker & Clark, High Point.	Feb. 21, '16	75	1.25
806	Wheat Feed.....	Atlanta Milling Co., Atlanta, Ga.	Adams Grain & Provision Co., Charlotte.	Nov. 30, '15	75	1.30
1016	Kentucky Farm Feed.....	Ballard & Ballard, Louisville, Ky.	H. C. Privatt, Edenton....	Mar. 28, '16	100	1.60
1065	do.....	do.....	Thomas Jobbing Co., Inc., Weldon.	Apr. 11, '16	100	1.60
1039	do.....	do.....	T. P. Nash, Elizabeth City.	Mar. 27, '16	100	1.65
835	do.....	do.....	do.....	Dec. 13, '15	100	1.65
845	do.....	do.....	W. S. White & Co., Elizabeth City.	Dec. 13, '15	100	1.65
749	Hog Feed.....	Statesville Flour Mill Co., Statesville, N. C.	W. H. Turner, Winston- Salem.	Nov. 3, '15	100	1.65
787	do.....	do.....	C. Cull, North Wilkesboro	Nov. 22, '15	100	1.65
889	do.....	do.....	Overman & Co., Salisbury	Jan. 24, '16	75	1.35
892	do.....	do.....	Cochran & McLaughlin, Charlotte.	Jan. 26, '16	100	1.65
971	do.....	do.....	F. D. Forrester & Co., North Wilkesboro.	Feb. 28, '16	100	1.60
969	do.....	do.....	C. Cull, North Wilkesboro	Feb. 28, '16	100	1.60

WITH AND WITHOUT SCREENINGS

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
714	Guaranteed..	14.5		4.0		9.5		Bran and shorts.
	Found.....	15.8	1.8	4.4	.4	5.6	3.9	
979	Guaranteed..							do.
	Found.....	14.3	.2	4.1	.1	6.0	3.5	
7211	Guaranteed..	14.0		3.2		4.9		do.
	Found.....	15.0	1.0	3.3	.1	4.8	.1	
879	Guaranteed..	15.1		4.0		7.0		do.
	Found.....	16.2	1.1	3.8	.2	5.8	1.2	
888	Guaranteed..	14.5		4.0		8.0		do.
	Found.....	17.0	2.5	4.1	.1	6.7	1.3	
801	Guaranteed..							do.
	Found.....	17.4	2.9	4.8	.8	7.5	.5	
798	Guaranteed..							do.
	Found.....	17.0	2.5	4.7	.7	7.5	.5	
786	Guaranteed..							do.
	Found.....	15.3		4.3		5.3		
778	Guaranteed..	16.0		3.5		8.5		Bran and shorts and screenings.
	Found.....	17.5		4.6	1.1	6.9	1.6	
827	Guaranteed..	15.8		4.1		7.1		Bran and shorts.
	Found.....	16.8	1.0	4.3	.2	4.1	3.0	
870	Guaranteed..							do.
	Found.....	15.9	.1	4.0	.1	6.7	.4	
1010	Guaranteed..							do.
	Found.....	16.6	.8	4.7	.6	6.8	.3	
996	Guaranteed..	14.5		4.0		5.0		do.
	Found.....	13.8	.7	4.0		5.2	.2	
805	Guaranteed..	16.5		4.0		8.0		Bran and shorts and screenings.
	Found.....	17.0	.5	4.0		6.5	1.5	
961	Guaranteed..							do.
	Found.....	14.7	1.8	4.0		6.4	1.6	
806	Guaranteed..	14.5		4.0		8.0		Bran and shorts.
	Found.....	15.0	0.5	4.0		7.1	.9	
1046	Guaranteed..	15.7		4.3		6.9		All wheat products.
	Found.....	13.9	1.8	4.3		5.6	1.3	
1065	Guaranteed..							do.
	Found.....	12.2	3.5	4.3		5.0	1.9	
1039	Guaranteed..							do.
	Found.....	13.4	2.3	4.3		5.4	1.5	
835	Guaranteed..							do.
	Found.....	15.4	0.3	4.3		5.3	1.6	
845	Guaranteed..							do.
	Found.....	13.3	2.4	4.2	0.1	6.7	0.2	
749	Guaranteed..	15.5		4.0		7.5		Wheat bran and shorts and mill run screenings.
	Found.....	15.5		3.1	.6	5.4	2.1	
787	Guaranteed..							do.
	Found.....	14.8	0.7	4.4	.4	6.1	1.4	
886	Guaranteed..							do.
	Found.....	14.2	1.3	4.2	.2	6.5	1.2	
892	Guaranteed..							do.
	Found.....	14.8	0.7	4.2	.2	5.8	1.7	
971	Guaranteed..							do.
	Found.....	14.3	1.2	4.2	.2	6.6	.9	
966	Guaranteed..							do.
	Found.....	14.6	.9	4.5	.5	6.1	1.4	

WHEAT BRAN AND MIDLINGS OR SHORTS

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price of Package
965	Hog Feed	Statesville Flour Mill Co., Statesville, N. C.	S. V. Thomlinson, North Wilkesboro.	Feb. 28, '16	100	\$1.60
999	do.	do.	W. M. Neel & Co., Mooreville.	Mar. 4, '16	100	1.60
726	Bran and Shorts.	do.	H. T. Newland, Lenoir.	July 17, '15	75	1.30
904	do.	Southern Milling Co., Nashville, Tenn.	City Feed Co., Hickory.	Feb. 8, '16	75	1.35

RECAPITU

Wheat Bran and Middlings or Shorts, With and Without Screenings

Guaranteed.....
 Found.....
 Deficient.....
 Range of deficiency.....
 Range of excess.....
 Average deficiency.....
 Average excess.....

SHIP

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price of Package
901	Shipstuf	Austin-Heaton, Durham, N. C.	Charles Moody Co., Char- lotte	Jan. 26, '16	75	\$1.25
905	do.	Overman-Williamson Co., Richmond, Va.	W. T. Gilbert, Charlotte.	Jan. 27, '16	100	1.75
740	do.	Dan Valley Mills, Dan- ville, N. C.	Elmore, Maxwell Co., Greensboro.	Nov. 2, '15	100	1.60
739	Arrow Shipstuf	Dunlop Mills, Richmond, Va.	do.	Nov. 2, '15	100	1.60
7109	do.	do.	W. A. Myatt, Raleigh.	Feb. 17, '16	100	1.65
871	do.	do.	Edwards & Harper, Kinston.	Jan. 14, '16	100	1.65
951	do.	do.	Parker & Parker, High Point.	Feb. 21, '16	75	1.20
1062	do.	do.	Weldon Grocery Co., Weldon	Apr. 11, '16	100	1.50

WITH AND WITHOUT SCREENINGS—Continued

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
965	Guaranteed							
	Found ..	13.1	1.0	4.2	2	6.0	1.7	Wheat bran and shorts and mill run screenings
999	Guaranteed							
	Found ..	11.3	1.2	3.6	1	5.9	1.6	do
726	Guaranteed							
	Found ..	15.1	1	4.6	.6	5.0	1.1	do
904	Guaranteed							
	Found ..	11.7		4.0		8.0		
	Found ..	14.7	.2	1.1	2	6.9	1.1	do

LATION

Protein	Fat	Kiber
14.0% to 16.5%	3.2% to 4.3%	5.0% to 9.5%
12.2% to 17.5%	3.3% to 4.8%	4.8% to 7.5%
14 or 45.0%	3 or 10.0%	27 or 90.0%
0.2% to 3.5%	0.1% to 0.6%	0.1% to 3.9%
0.1% to 2.9%	0.1% to 1.1%	0.0% to 0.5%

STUFF

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
961	Guaranteed	16.0		1.5		5.5		
	Found ..	14.9	1.1	4.7	.2	6.4	.9	Ship-stuff.
906	Guaranteed	15.0		4.0		8.0		
	Found ..	15.2	.2	5.9	1.9	8.8		do.
740	Guaranteed	15.0		5.0		6.0		
	Found ..	15.6	.6	4.2	.8	5.8	.2	do.
739	Guaranteed	16.0		4.5		7.0		
	Found ..	17.0	1.0	4.4	1	5.7	1.3	Shipstuff and ground screenings
7109	Guaranteed							
	Found ..	15.3	0.1	4.6	.1	5.0	1.1	do.
871	Guaranteed							
	Found ..	15.4	0.4	4.5		5.5	1.5	do
959	Guaranteed	15.0		4.6		8.0		
	Found ..	15.2	.2	3.8	.2	5.5	2.5	do.
1062	Guaranteed							
	Found ..	15.1	.1	3.7	.3	5.3	2.8	do.

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	SHIP	
					Claimed Weight of Package—Lbs.	Price of Package
1037	Arrow Shipstuff.	Dunlop Mills, Richmond, Va.	R. B. Peters Grocery Co., Tarboro.	Mar. 21, '16	100	\$1.80
775	Shipstuff.	Hico Milling Co., Burling- ton, N. C.	A. W. Norwood, Graham.	Nov. 9, '15	100	1.60
849	do.	Mayflower Mills, Fort Wayne, Ind.	J. A. Woodard-Holmes Co., Edenton.	Dec. 11, '15	100	1.75
770	Piedmont Shipstuff.	Piedmont Mills, Lynch- burg, Va.	Patterson Co., Greensboro	Nov. 8, '15	100	1.60
755	do.	do.	W. H. Turner, Winston- Salem.	Nov. 3, '15	100	1.65
780	do.	do.	Farmer's Supply Co., Charlotte.	Nov. 10, '15	75	1.25
862	do.	do.	Sink & Love, Winston- Salem.	Jan. 11, '16	100	1.65
802	Shipstuff.	J. Allen Smith Co., Knox- ville, Tenn.	F. D. Barkley & Co., Gastonia.	Nov. 30, '15	75	1.30
918	do.	do.	J. D. Earle Feed Co., Asheville.	Feb. 10, '16	75	1.35
1072	do.	Seaboard Milling Co., Sanford, N. C.	Seaboard Milling Co., Sanford.	July 19, '16	100	1.50
858	do.	Southside Roller Mills, Winston-Salem, N. C.	Rege & Stewart, Winston- Salem.	Jan. 11, '16	100	1.65

RECAPITU

Shipstuff

Guaranteed. ....	.....
Found. ....	.....
Deficient. ....	.....
Range of deficiency. ....	.....
Range of excess. ....	.....
Average deficiency. ....	.....
Average excess. ....	.....

STUFF

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
1037	Guaranteed...	16.1		4.5		7.9		1.4 Ship-stuff and ground screenings
	Found...	11.2	4.8	4.1		4	5.6	
773	Guaranteed...	16.2		4.2		6.5		2.3 Ship-stuff
	Found...	11.9	4.3	3.1		8	4.2	
841	Guaranteed...	11.6		4.9		8.0		do
	Found...	14.8	8	6.0	2.0	8.6	6	
770	Guaranteed...	15.0		4.0		8.0		do
	Found...	14.8	.2	4.2	.2	5.8	2.2	
753	Guaranteed...	...		...		...		do
	Found...	11.5	.5	4.3	.3	5.0	3.0	
786	Guaranteed...	...		...		...		do
	Found...	15.5	.5	4.6	.6	6.6	1.4	
862	Guaranteed...	...		...		...		do
	Found...	15.6	.1	4.7	.1	6.8	1.2	
802	Guaranteed...	15.9		4.0		7.0		do
	Found...	16.0	1.0	3.9	.1	5.6	1.4	
918	Guaranteed...	...		...		...		do
	Found...	16.1	1.1	4.2	.2	6.2	.8	
1072	Guaranteed...	16.0		4.0		8.0		do
	Found...	16.0		4.4	.4	6.2	1.8	
858	Guaranteed...	14.4		4.6		5.7		do
	Found...	15.7	1.3	5.1	.5	6.5	.8	

LATION

Protein	Fat	Fiber
14.0% to 16.0%	4.0% to 4.6%	5.5% to 8.0%
14.2% to 17.0%	3.4% to 6.0%	4.2% to 8.8%
7 or 37.0%	7 or 37.0%	15 or 79.0%
0.1% to 1.8%	0.1% to 0.8%	0.2% to 2.8%
0.1% to 1.3%	0.1% to 2.0%	0.6% to 0.9%

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	RED	
					Claimed Weight of Package-Lbs.	Price of Package
744	Red Dog.....	Bay State Milling Co., Winona, Minn.	Elmore-Maxwell Co., Greensboro.	Nov. 2, '15	100	\$1.90
773	do.....	do.....	Patterson Co., Greensboro	Nov. 8, '15	100	1.85
923	do.....	Blish Milling Co., Sey- more, Ind.	J. D. Earle Feed Co., Asheville.	Feb. 10, '16	75	1.95
814	Superb Red Dog.....	Eagle Roller Mill Co., Chm, Minn.	Spring Hope Grocery Co., Spring Hope.	Dec. 7, '15	100	2.00
755	do.....	do.....	Winston Grain Co., Winston-Salem.	Nov. 3, '15	100	1.75
878	Elmco Wheat Red Dog...	Listman Mill Co., La Crosse, Wis.	B. G. Thompson & Son, Goldsboro.	Jan. 14, '16	100	1.90
766	Adrian Flour.....	Washburn-Crosby Co., Minneapolis, Minn.	Patterson Co., Greensboro	Nov. 8, '15	100	1.85

RECAPITU

Red Dog

Guaranteed.....
Found.....
Deficient.....
Range of deficiency.....
Range of excess.....
Average deficiency.....
Average excess.....

MIXED FEEDS NOT

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	MIXED FEEDS NOT	
					Claimed Weight of Package-Lbs.	Price of Package
721	Standard Mixed Feed	American Feed Milling Co., Asheville, N. C.	American Feed Milling Co., Asheville.	July 16, '15	75	\$1.25
821	Mill Feed	Atlanta Milling Co., Atlanta, Ga.	Matthews, Weeks & Co., Rocky Mount.	Dec. 8, '15	100	1.50
767	Corno Horse and Mule Feed.	Corno Mills Co., St. Louis, Mo.	Patterson Co., Greensboro	Nov. 8, '15	100	1.80
776	Mill Feed	Gibsonville Milling Co., Gibsonville, N. C.	A. W. Woodrow, Graham.	Nov. 9, '15	100	1.60
1058	Gwinn's Horse and Mule Feed.	Gwinn Milling Co., Columbus, Ohio.	E. H. & M. V. Lawrence, Durham	Mar. 29, '16	100	.....

DOG

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
744	Guaranteed	18.0		4.0		2.5		
	Found	16.8	1.2	4.7		4.3	1.2	Red dog.
773	Guaranteed	15.0		4.1		1.1		
	Found	15.0	2.4	4.1		1.1	1.1	do.
923	Guaranteed	15.1		5.1		1.0		
	Found	16.3	1.2	2.8		1.4	1	do.
844	Guaranteed	17.0		4.4		7.4		
	Found	17.4	1	5.0		3.2	4.2	do.
755	Guaranteed	17.1		5.2		4.0	3.0	do.
	Found	17.1	.4	5.2		4.0	3.0	do.
878	Guaranteed	17.1		4.7		3.1		
	Found	11.0	3.1	3.7	1.0	0.7	2.4	do.
766	Guaranteed	17.0		5.0		4.0		
	Found	17.1	1	5.2	.3	2.1	4.9	do.

LATION

Protein	Fat	Fiber
15.1% to 18.0%	3.4% to 5.0%	2.5% to 7.4%
14.0% to 17.4%	2.8% to 5.3%	0.7% to 4.0%
2 or 28.0%	1 or 14.0%	6 or 86.0%
1.2% to 2.4%	0.0% to 0.6%	1.2% to 4.2%
0.4% to 3.1%	0.1% to 1.0%	0.0% to 0.4%

CONTAINING MOLASSES

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
721	Guaranteed	12.6		3.5		8.6		
	Found	12.3	.3	4.7	1.2	4.0	3.4	Wheat shorts, middlings, bran, corn meal.
821	Guaranteed	13.0		4.0		9.5		
	Found	15.5	2.5	4.2	.2	6.7	3.4	Wheat and corn mill feed, ground screenings, Alfalfa, cracked corn, c. s. meal, hominy feed, oat feed
767	Guaranteed	10.0		3.5		15.0		
	Found	13.5	3.5	3.8	.3	10.0	5.0	feed
776	Guaranteed	13.5		3.5		5.5		
	Found	13.5		3.5		4.1	1.4	Wheat bran, shorts, feed wheat, corn meal, oats.
1058	Guaranteed	10.0		4.0		8.0		
	Found	9.5	.5	4.1	.1	3.0	4.1	Corn and oats.

MIXED FEEDS NOT

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of package-Lbs.	Price of Package
957	Perfect Mixed Feed.....	H. L. Halliday Milling Co., Cairo, Ill.	Parker & Clark, High Point.	Feb. 21, '16	100	\$2.00
974	Red Tag Cow Chop.....	Lindsey, Robinson & Co., Roanoke, Va.	Williams & Snow, Elkin	Feb. 28, '16	100	1.60
820	Larro Feed (Dairy).....	Larrowe Milling Co., Detroit.	Matthews, Weeks & Co., Rocky Mount.	Dec. 8, '15	100	1.65
885	do.....	do.....	W. L. Kluttz, Salisbury.	Jan. 24, '16	100	2.00
1063	do.....	do.....	Weldon Grocery Co., Weldon.	April 11, '16	100	1.60
723	Fine Feed or Feed Meal...	Mountain City Mill, Chattanooga, Tenn.	Henderson Grocery Co., Henderson.	July 17, '15	75	1.35
715	do.....	do.....	Asheville Grocery Co., Asheville.	July 16, '15	75	1.35
713	do.....	do.....	J. E. Sloop, Statesville.....	July 21, '15	100	1.85
930	do.....	do.....	Adams Grain & Provision Co., Asheville.		75	1.30
747	do.....	do.....	W. H. Turner, Winston- Salem.	Nov. 3, '15	75	1.25
917	do.....	do.....	J. D. Earle Feed Co., Asheville.	Feb. 10, '16	75	1.30
935	do.....	do.....	Slayden Fakes & Co., Asheville.	Feb. 14, '16	75	1.15
941	do.....	do.....	Slayden Fakes & Co., Bryson City.	Feb. 15, '16	75	.....
962	do.....	do.....	Parker & Clark, High Point.	Feb. 21, '16	75	1.25
976	do.....	do.....	Williams & Snow, Elkin ..	Feb. 28, '16	100	1.65
882	Hog Feed.....	Grimes Milling Co., Salis- bury, N. C.	W. L. Kluttz, Salisbury	Jan. 21, '16	75	1.30
955	Imperial Feed.....	Newport Mill Co., London, Tenn.	Parker & Clark, High Point.	Feb. 21, '16	75	1.20
763	Mixed Feed.....	do.....	Patterson Co., Greensboro	Nov. 28, '15	100	1.50
788	Mill Feed.....	North Wilkesboro Roller Mills, N. Wilkesboro, N. C.	North Wilkesboro Roller Mills, North Wilkesboro.	Nov. 22, '15	100	1.70
708	Ever Green Horse Feed...	Omaha Alfalfa Milling Co., Omaha, Neb.	West-Hill Co., Mount Airy	July 9, '15	100	1.80
705	Putina Molasses Feed...	Putina Mills, St. Louis, Mo.	J. C. Lovell & Co., Mount Airy.	July 9, '15	100	1.80
772	Schumacher Special Horse Feed,	Quaker Oats Co., Chicago Ill.	Patterson Co., Greensboro	Nov. 8, '15	100	1.80
1056	Schumacher Feed	do.....	E. H. & M. V. Lawrence Durham.	Mar. 29, '16	100	1.80
1006	Royal Feed	C. L. Spencer, New Bern, N. C.	C. L. Spencer, New Bern	Mar. 10, '16	100	1.80
727	Mixed Feed	Spargar Mill Co., Bristol, Va.-Tenn.	W. W. Linebaker, Elk Park	..	50	.....

* Absent

CONTAINING MOLASSES—Continued

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
957	Guaranteed..	10.0		3.5		7.0		5 Rolled oats and steel cut corn.
	Found.....	10.2	.2	4.1	.6	7.5		
971	Guaranteed..	15.0		4.0		15.0		Corn, wheat bran and shorts, corn bran, cotton seed meal.
	Found.....	14.7	-.3	4.1	.1	14.6	-.4	
820	Guaranteed..	19.0		3.0		14.0		C. S. meal, corn gluten feed, dried distillers' grains, dried beet pulp, wheat bran and middlings, screenings, salt.
	Found.....	21.3	1.3	3.6	.6	12.2	-1.8	
883	Guaranteed..							do.
	Found.....	20.6	1.6	4.0	1.0	11.3	-.9	
1063	Guaranteed..							do.
	Found.....	20.1	1.1	4.5	1.5	12.5	-1.5	
723	Guaranteed..	12.5		5.5		8.5		Wheat middlings and shorts, ground screenings, corn bran, corn hearts, corn meal.
	Found.....	14.6	2.1	4.7	-.8	4.7	-3.8	
715	Guaranteed..							do.
	Found.....	13.1	.8	5.0	-.5	5.3	-3.2	
713	Guaranteed..							do.
	Found.....	13.5	1.0	5.0	-.5	5.8	-2.7	
930	Guaranteed..							do.
	Found.....	13.8	1.3	4.3	-1.2	4.5	-4.0	
747	Guaranteed..							do.
	Found.....	13.5	1.0	5.2	-.3	4.9	-3.6	
917	Guaranteed..							do.
	Found.....	13.2	.7	4.2	-1.3	4.6	-3.9	
935	Guaranteed..							do.
	Found.....	12.8	.3	4.3	-1.2	4.2	-4.3	
941	Guaranteed..							do.
	Found.....	13.8	1.3	4.6	-.9	4.8	-3.7	
962	Guaranteed..							do.
	Found.....	13.3	.8	3.9	-1.6	3.8	-4.7	
976	Guaranteed..							do.
	Found.....	12.8	.3	4.1	-1.4	4.2	-4.3	
882	Guaranteed..	15.7		4.0		7.0		.8 Corn meal, wheat bran and shorts.
	Found.....	15.4	.3	4.0		6.2	-.8	
955	Guaranteed..	13.0		4.0		8.0		Wheat bran and shorts, corn bran and meal and screenings, wheat screenings, ear corn.
	Found.....	12.2	-.8	4.6	.6	12.5	4.5	
763	Guaranteed..	13.5		4.0		8.0		do.
	Found.....	14.8	1.3	4.6	.6	6.2	-1.8	
788	Guaranteed..	15.1		4.1		5.1		.4 Wheat bran and shorts, light wheat, corn chops.
	Found.....	16.1	1.0	4.1		5.0	-.1	
708	Guaranteed..	10.9		2.0		12.0		1.9 Corn, oats, alfalfa
	Found.....	9.7	-.3	2.1	.1	10.1	-1.9	
705	Guaranteed..	9.3		1.7		11.7		do.
	Found.....	9.7	.4	2.8	1.1	9.0	-2.7	
772	Guaranteed..	10.0		4.0		8.0		Ground corn, crushed oats, C. S. meal*, oatmeal mill by-products.
	Found.....	9.3	-.7	3.4	.6	8.1	.1	
1056	Guaranteed..	10.0		4.0		9.0		Ground corn, hominy feed, ground barley, wheat flour, wheat middlings and screenings, ground puffed rice, ground puffed wheat, C. S. meal, oat meal mill by products, salt.
	Found.....	9.5	-.5	2.5	-1.5	10.0	1.0	
1006	Guaranteed..	10.0		6.0		10.4		6.2 Corn chops, oats, C. S. meal, wheat bran.
	Found.....	11.1	1.1	5.1	-.9	4.2		
727	Guaranteed..	14.9		4.5		5.7		1.1 Wheat bran and shorts, corn bran.
	Found.....	15.8	.9	5.0	.5	6.8	1.1	

MIXED FEEDS NOT

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price of Package
764	Peerless Feed.....	J. Allen Smith & Co., Knoxville, Tenn.	Patterson Co., Greensboro	Nov. 8, '15	100	\$1.60
751	do.....	do.....	W. H. Turner, Winston-Salem.	Nov. 3, '15	100	1.50
964	do.....	do.....	S. V. Tomlinson, Wilkesboro.	Feb. 28, '16	100	1.60
731	Union Grains.....	Wiko Milling Co., Cincinnati, Ohio.	Farmers Union Agency Co., Winston-Salem.	Sept. 13, '15	100	1.95
759	do.....	do.....	do.....	Nov. 8, '15	100	1.90
722	Desoto Feed.....	Valley Milling Co., St. Louis, Mo.	Hendersonville Grocery Co., Hendersonville.	July 16, '15	100	2.35
794	Mixed Feed.....	Wright Milling Co., Bluefield, W. Va.	Cromer Bros., Winston-Salem.	Nov. 26, '15	100	1.60
846	Mixed Corn and Oat Feed.	W. S. White & Co., Elizabeth City, N. C.	W. S. White & Co., Elizabeth City.	Dec. 13, '15	100	1.50

RECAPITU

Mixed Feeds Not Containing Molasses

Guaranteed.....
Found.....
Deficient.....
Range of deficiency.....
Range of excess.....
Average deficiency.....
Average excess.....

MIXED FEEDS CON

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price of Package
736	Molasses Alicorn Horse and Mule Feed.	Alicorn Milling Co., East St. Louis, Ill.	Elmore-Maxwell Co., Greensboro.	Nov. 2, '15	100	\$1.75
942	Big Chief Horse and Mule Feed.	American Feed Milling Co., Asheville, N. C.	Slayden Fakes Co., Bryson City.	Feb. 15, '16	100	1.85
937	do.....	do.....	Slayden Fakes Co., Asheville.	Feb. 14, '16	100	1.80
833	Colonial Horse and Mule Feed.	Colonial Cereal Co., Norfolk, Va.	F. P. Nash, Elizabeth City.	Dec. 13, '15	100	1.60
849	Colonial Dairy Feed.....	do.....	W. S. White & Co., Elizabeth City.	Dec. 13, '15	100	1.50

TAINING MOLASSES—Continued.

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
761	{ Guaranteed	14.0		1.0		7.0		Wheat bran and shorts, corn meal and bran, wheat and corn screenings.
	{ Found	15.1	1.1	3.4	.6	3.9	3.1	
751	{ Guaranteed							do.
	{ Found	16.1	2.1	4.1	.1	5.3	1.7	
964	{ Guaranteed							do.
	{ Found	14.1	.1	5.3	1.3	5.1	1.6	
731	{ Guaranteed	24.0		7.0		9.0		Distillers' dried grains, C. S. meal, linseed meal, wheat bran and middlings, hominy meal, malt sprouts, salt.
	{ Found	23.5	.2	6.5	.5	9.5	.4	
759	{ Guaranteed							do.
	{ Found	25.6	1.0	6.5	.2	9.5	.3	
722	{ Guaranteed	10.0		3.0		1.5		8 Cracked corn, wheat, Katfir corn.
	{ Found	11.1	1.1	2.5	-0.5	1.5		
794	{ Guaranteed	13.2		4.0		8.4		Wheat bran and middlings, red dog, rye middlings, corn bran and grits.
	{ Found	11.6	-1.6	3.9	-0.1	8.5	.4	
846	{ Guaranteed	9.4		4.4		3.5		do.
	{ Found	9.4		5.6	.6	3.5	.6	

LATION

Protein	Fat	Fiber
9.3% to 24.0%	2.0% to 7.0%	1.0% to 15.0%
9.3% to 25.0%	2.1% to 6.8%	1.8% to 12.5%
8 or 21.0%	18 or 46.0%	27 or 70.0%
0.3% to 1.6%	0.1% to 1.6%	0.8% to 6.2%
0.1% to 3.5%	0.1% to 1.5%	0.1% to 1.1%

TAINING MOLASSES

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
736	{ Guaranteed	9.0		2.0		13.5		Alfalfa meal, crushed oats, cracked corn, cane molasses.
	{ Found	9.4	.4	2.0		12.0	-1.5	
942	{ Guaranteed	10.0		3.5		7.5		Cracked corn, oats, alfalfa, salt, molasses.
	{ Found	9.0	-1.0	3.8	.3	6.8	-.7	
937	{ Guaranteed							do.
	{ Found	8.8		3.4		8.6	.8	
833	{ Guaranteed	10.0		2.5		13.0		Crushed corn, oats, alfalfa, oatmeal mill by-products, C. S. feed, ground grain screenings, salt, molasses.
	{ Found	10.2	.2	2.0	-.5	15.3	-2.3	
840	{ Guaranteed	15.0		3.5		20.0		Ground corn, corn bran, alfalfa, oatmeal mill by-products, C. S. feed, ground grain screenings, salt, molasses.
	{ Found	8.5	-6.5	3.6	.1	12.3	-8.7	

MIXED FEEDS CON

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price of Package
943	Nutro Sweet Feed.....	Corno Mill Co., St. Louis, Mo.	Slayden Fakes Co., Bryson City.	Feb. 15, '16	100	\$1.85
1001	do.....	do.....	T. P. Ashfort, New Bern.	Mar. 10, '16	100	.....
813	Indian Molasses Feed.....	Davis Milling Co., Norfolk, Va.	W. D. Holland, Dunn.....	Dec. 7, '15	100	1.85
569	Old Beck Sweet Feed.....	Edgar-Morgan Co., Memphis, Tenn.	C. A. Dawson & Bro., Kinston.	Jan. 14, '16	100	1.90
893	do.....	do.....	Cochran-McLaughlin, Charlotte.	Jan. 26, '16	100	1.70
568	Gem Sweet Dairy Feed.....	do.....	C. A. Dawson & Bro., Kinston.	Jan. 14, '16	100	1.75
761	Sho-Me-Horse and Mule Feed.	Excello Feed Milling Co., St. Joseph, Mo.	Farmers Union Agency Co., Winston-Salem.	Nov. 8, '15	100	1.75
954	Excello Horse Feed.....	do.....	G. C. Lovell & Co., Mount Airy.	Mar. 1, '16	100	1.75
1014	do.....	do.....	John S. McEachern Sons, Wilmington.	Mar. 13, '16	100	.....
1069	Derby Horse Feed.....	Ferger Grain Co., Cincinnati, Ohio.	Littleton Feed & Grocery Co., Littleton.	April 12, '16	100	1.80
718	Ben Hur Horse and Mule Feed.	Golden Grain Milling Co., East St. Louis, Ill.	Adams Grain & Provision Co., Asheville.	July 16, '15	100	1.85
932	do.....	do.....	do.....		100	1.95
929	Golden Grain Horse and Mule Feed.	do.....	do.....		100	1.90
884	do.....	do.....	W. L. Klutz, Salisbury.....	Jan. 24, '16	100	1.90
704	Besto Molasses Feed.....	J. T. Gibbons, New Orleans, La.	G. C. Lovell & Co., Mount Airy.	July 9, '15	100	1.85
998	Special Mixed Feed.....	H. L. Halliday Milling Co., Cairo, Ill.	W. M. Neel, Mooresville...	Mar. 4, '16	100	1.85
729	Champion Brand Horse and Mule Molasses Feed	Henderson Grain and Feed Co., Henderson, N. C.	Snyder and Huntly Co., Monroe.	Sept. 1, '15	100	1.75
781	do.....	do.....	Farmers Supply Co., Charlotte.	Nov. 10, '15	100	1.75
720	International Jewel Feed	International Sugar Feed No. 2 Co., Memphis Tenn.	Adams Grain & Provision Co., Asheville.	July 16, '15	100	1.75
928	Jewel Dairy Feed.....	do.....	do.....		100	1.75
909	Just Dairy Feed.....	Just Mills, Nashville, Tenn.	Marion Cash Feed Co., Marion.	Feb. 9, '16	100	2.00
823	Just Horse Feed.....	do.....	Matthews-Weeks & Co., Rocky Mount.	Dec. 8, '15	100	1.80
825	do.....	do.....	Wholesale Grocery Co., Tarboro.		100	1.85
910	do.....	do.....	Marion Cash Feed Co., Marion.	Feb. 9, '16	100	1.85
1049	do.....	do.....	Griffin & Woodward, Washington.	Mar. 28, '16	100	1.75
825	Ajay Horse Feed.....	do.....	Matthews Weeks & Co., Rocky Mount.	Dec. 8, '15	100	1.80
829	Little Jo Horse Feed.....	do.....	Wholesale Grocery Co., Tarboro.		100	1.75
711	Kornallia Kandy Feed	Kornallia Feed Co., Kansas City, Mo.	J. E. Sloop, Statesville....	July 21, '15	100	2.00

TAINING MOLASSES—Continued.

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
943	Guaranteed	10.0		2.5		15.0		Alfalfa, cracked corn, oat feed, ground grain
	Found	10.6	.6	2.7	.2	16.6	1.6	screenings, molasses.
1001	Guaranteed							
	Found	8.7	- 1.9	3.1	.4	12.6	- 2.4	do.
813	Guaranteed	10.0		2.0		12.0		
	Found	10.3	.3	1.5	-.5	8.2	- 3.8	Cracked corn, rolled oats, alfalfa, molasses.
869	Guaranteed	9.0		2.0		12.0		
	Found	10.4	1.4	3.0	1.0	10.0	- 2.0	Alfalfa, oats, corn, cane molasses.
833	Guaranteed							
	Found	10.2	1.2	2.5	.5	8.8	- 1.2	do.
898	Guaranteed	16.0		2.0		15.0		Alfalfa, brewers' grain, wheat bran, cotton seed
	Found	17.2	1.2	2.5	.5	14.0	- 1.0	meal, cane molasses.
761	Guaranteed	9.0		2.0		17.0		
	Found	9.1	.1	1.6	-.4	14.6	- 3.6	Alfalfa, ground corn, oats, salt, molasses.
984	Guaranteed	10.0		3.0		15.0		Alfalfa, corn chops, crushed oats, linseed meal,
	Found	12.2	2.2	2.6	-.4	9.6	- 5.4	salt, molasses
1014	Guaranteed							
	Found	11.6	1.6	2.6	-.2	13.0	- 2.0	do.
1069	Guaranteed	10.0		3.0		12.0		Corn, oats, wheat bran, cotton-seed meal, alfalfa,
	Found	9.7	-.3	3.3	.3	7.6	- 4.4	molasses.
718	Guaranteed	10.0		2.0		12.0		
	Found	8.8	- 1.2	2.3	.3	10.8	- 1.2	Corn, oats, alfalfa, molasses.
932	Guaranteed							
	Found	10.2	.2	3.2	1.2	8.0	- 4.0	do.
929	Guaranteed	10.0		2.0		12.0		
	Found	10.4	.4	2.1	.1	11.7	-.3	do.
884	Guaranteed							
	Found	10.5	.5	1.8	.2	10.8	- 1.2	do.
704	Guaranteed	10.0		3.5		12.0		
	Found	12.5	2.5	2.8	-.7	8.1	- 3.9	Corn, oats, alfalfa, molasses.
998	Guaranteed	9.0		2.0		15.0		
	Found	12.0	3.0	2.7	.7	12.8	- 2.2	Corn, oats, oat feed, alfalfa, molasses.
729	Guaranteed	10.0		2.8		12.0		Cracked corn, cracked oats, alfalfa, cotton-seed
	Found	10.6	.6	3.1	.3	12.8	.8	meal, molasses.
781	Guaranteed							
	Found	11.6	1.6	1.9	-.9	16.5	4.5	do.
720	Guaranteed	9.0		2.0		12.0		
	Found	8.2	- 0.8	1.6	-.4	13.7	1.7	Corn, alfalfa, oat by-product, salt, molasses.
928	Guaranteed	9.0		2.0		12.0		
	Found	10.2	1.2	2.2	.2	11.3	-.7	Alfalfa, clipped oat by-product, salt, molasses.
909	Guaranteed	20.0		3.5		12.0		Cotton-seed meal, brewers' dried grains, ground
	Found	21.7	1.7	3.5		15.0	3.0	alfalfa, corn hearts, salt, molasses.
823	Guaranteed	10.0		2.0		11.0		
	Found	10.6	.6	2.3	.3	12.6	1.6	Cracked corn, oats, alfalfa, salt, molasses.
828	Guaranteed							
	Found	11.1	1.1	2.2	.2	13.3	2.3	do.
910	Guaranteed							
	Found	10.9	.9	2.6	.6	10.8	-.2	do.
1049	Guaranteed							
	Found	10.1	.1	2.2	.2	11.7	.7	do.
875	Guaranteed	9.0		1.5		12.0		
	Found	9.6	.6	2.0	.5	14.6	2.6	do.
829	Guaranteed	9.0		1.5		12.0		
	Found	11.0	2.0	2.0	.5	15.9	3.9	do.
711	Guaranteed	9.0		2.5		12.0		
	Found	12.0	3.0	1.6	-.9	8.6	- 3.4	Corn, oats, alfalfa, molasses.

MIXED FEEDS CON

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package, Lbs.	Price of Package
1002	Buckeye Molasses Feed...	Geo. B. Matthews & Sons, New Orleans, La.	Maxwell & Pugh, New Bern.	Mar. 10, '16	100	1.75
854	Dixie Gem Molasses Feed	National Milling Co., Macon, Ga.	C. G. Morris, Washington	Dec. 15, '15	100	1.50
1005	do.....	do.....	C. L. Spenceer, New Bern.	Mar. 10, '16	100	1.75
1000	Best Yet Molasses Feed...	do.....	T. P. Aslford, New Bern.	Mar. 10, '16	100	1.80
7089	Nutri-Laden Horse and Mule Feed.	Farmers Cotton Oil Co., Wilson, N. C.	Peebles Bros., Raleigh	Dec. 24, '15	100	1.75
701	Peerless Alfalmo Horse	Omaha Alfalfa Milling Co., Omaha, Neb.	W. B. Haymore, Mount Airy.	July 9, '15	100	1.85
737	do.....	do.....	Elmore, Maxwell Co., Greensboro.	Nov. 2, '15	100	1.75
897	do.....	do.....	Chas. Moody & Co., Charlotte.	Jan. 26, '16	100	1.65
1030	do.....	do.....	B. F. Mitchell Co., Wilmington.	Mar. 14, '16	100	1.85
831	Evergreen Horse Feed...	do.....	Cummings Grocery Co., Tarboro.	.....	100	1.85
895	Al-Corn-O Horse Feed...	do.....	Chas. Moody Co., Char- lotte.	Jan. 26, '16	100	1.65
896	Omaha Special Feed.....	do.....	do.....	June 26, '16	100	1.65
881	Arab Horse Feed.....	M. C. Peters Mill Co., Omaha, Neb.	H. Z. White, Salisbury	Jan. 24, '16	100	2.00
915	do.....	do.....	J. D. Earle Feed Co., Asheville.	Feb. 10, '16	100	1.90
1024	do.....	do.....	D. L. Gore Co., Wilming- ton.	Mar. 14, '16	100	1.80
834	Re-Peter Horse Feed.....	do.....	T. P. Nash, Elizabeth City.	Dec. 13, '15	100	1.70
916	do.....	do.....	J. D. Earle Feed Co., Asheville.	Feb. 10, '16	100	1.85
1044	do.....	do.....	T. P. Nash, Elizabeth City.	Mar. 27, '16	100	1.75
926	Robit Mule Feed.....	do.....	J. D. Earle Feed Co., Asheville.	Feb. 10, '16	100	1.75
925	June Pasture Dairy Feed...	do.....	do.....	Feb. 10, '16	100	1.40
1026	do.....	do.....	D. L. Gore, Wilmington	Mar. 14, '16	100	1.65
890	King Corn.....	do.....	Overman & Co., Salisbury	Jan. 24, '16	100	1.90
977	do.....	do.....	Williams & Snow, Elkin	Feb. 28, '16	100	1.90
855	Purina Feed with Mo- lasses.	Purina Mills, St. Louis, Mo.	C. G. Morris, Washington	Dec. 15, '15	100	1.75
986	do.....	do.....	G. C. Lovell Co., Mount Airy.	Mar. 1, '16	100	1.75
876	Purina Dairy Feed.....	do.....	M. J. Best & Sons, Golds- boro.	Jan. 14, '16	100	1.90
856	Good Luck Feed with Mo- lasses.	Ralston Purina Co., St. Louis, Mo.	C. G. Morris, Washington	Dec. 15, '15	100	1.65
7208	Capital Dairy Feed.....	Raleigh Grain and Milling Co., Raleigh, N. C.	T. B. Crowder & Son, Raleigh.	June 8, '16	100	1.65

*Not appreciably present C. S. hulls, a little cracked corn and a little oats present.

TAINING MOLASSES—Continued.

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
1002	Guaranteed..	9.0		2.0		12.0		Corn, alfalfa, rice bran, oat by-products, C. S. meal, salt, molasses.
	Found.....	9.5	.5	4.3	2.3	10.1	- 1.9	
854	Guaranteed..	9.0		2.0		12.0		Alfalfa hay screenings, ground corn, oats, C. S. meal, brewers' grains, cane molasses.
	Found.....	10.4	1.4	1.9	-.1	17.8	5.8	
1005	Guaranteed..							do.
	Found.....	11.2	2.2	1.7	-.3	9.6	- 2.4	
1000	Guaranteed..	9.0		2.0		12.0		do.
	Found.....	9.7	.7	1.8	-.2	16.3	4.3	
7089	Guaranteed..	10.0		2.5		10.0		Alfalfa, oats, corn, C. S. meal, salt, molasses.
	Found.....	10.5	.5	2.6	.1	13.0	3.0	
701	Guaranteed..	10.0		2.0		12.0		Corn, oats, alfalfa, molasses.
	Found.....	9.8	-.2	2.4	.4	10.0	2.0	
737	Guaranteed..							do.
	Found.....	11.8	1.8	2.2	.2	11.9	-.1	
897	Guaranteed..							do.
	Found.....	14.0	4.0	2.0		11.3	-.7	
1030	Guaranteed..							do.
	Found.....	9.9	-.1	1.8	-.2	12.6	.6	
831	Guaranteed..	10.0		2.0		12.0		Corn, oats, alfalfa, molasses.
	Found.....	10.3	.3	2.3	.3	14.2	2.2	
895	Guaranteed..							do.
	Found.....	12.5	2.5	1.4	-.6	13.9	1.9	
896	Guaranteed..							do.
	Found.....	13.2	3.2	1.2	-.8	12.2	0.2	
881	Guaranteed..	10.0		2.0		15.0		Cracked corn, whole oats, alfalfa, molasses.
	Found.....	11.3	1.3	2.7	.7	9.1	- 5.9	
915	Guaranteed..							do.
	Found.....	11.3	1.3	2.8	.8	10.1	- 4.9	
1024	Guaranteed..							do.
	Found.....	11.3	1.3	3.1	1.1	10.1	- 4.9	
834	Guaranteed..	9.0		1.5		18.0		Corn, oats, alfalfa, molasses.
	Found.....	12.5	3.5	2.5	1.0	9.9	- 8.1	
916	Guaranteed..							do.
	Found.....	10.9	1.9	2.7	1.2	9.9	- 8.1	
1044	Guaranteed..							do.
	Found.....	11.8	2.8	2.7	1.2	12.2	- 5.8	
926	Guaranteed..	9.0		1.5		18.0		do.
	Found.....	12.0	3.0	1.2	-.3	15.9	- 2.1	
925	Guaranteed..	10.0		.5		26.0		Alfalfa, molasses.
	Found.....	14.2	4.2	.8	.3	20.6	- 5.4	
1026	Guaranteed..							do.
	Found.....	14.8	4.8	1.1	.6	18.5	- 7.5	
890	Guaranteed..	10.0		1.5		18.0		Corn, oats, alfalfa, molasses.
	Found.....	12.7	2.7	2.0	.5	13.8	- 4.2	
977	Guaranteed..							do.
	Found.....	12.4	2.4	1.2	-.3	15.1	- 2.9	
855	Guaranteed..	9.3		1.7		11.7		Cracked corn, whole oats, alfalfa, salt, molasses.
	Found.....	11.8	2.5	2.0	.3	16.2	4.5	
986	Guaranteed..							do.
	Found.....	11.9	2.6	2.0	.3	9.2	- 2.5	
876	Guaranteed..	20.0		3.8		15.0		C. S. meal, brewers' dried grains, gluten feed, alfalfa, salt, molasses.
	Found.....	21.9	1.9	3.3	-.5	17.1	2.1	
856	Guaranteed..	9.0		1.5		12.0		Cracked corn, whole oats, alfalfa, salt, molasses.
	Found.....	12.0	3.0	1.7	.2	13.9	1.9	
7208	Guaranteed..	16.0		3.0		15.0		Alfalfa, wheat bran, ground grain screenings, cotton-seed meal*, salt, molasses.
	Found.....	8.6	- 7.4	1.5	- 1.5	16.7	1.7	

MIXED FEEDS CON

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package, Lbs.	Price of Package
7209	Capital Horse and Mule Feed.	Raleigh Grain Milling Co., Raleigh, N. C.	T. B. Crowder & Son, Raleigh.	June 8, '16.	100	\$1.75
771	Golden Sweet Mule Feed	Quaker Oats Co., Chicago, Ill.	Patterson Co., Greensboro	Nov. 8, '15	100	1.55
707	Big Mule Molasses Feed	do.	West-Hill Co., Mount Airy.	July 9, '15	100	1.90
988	do.	do.	do.	Mar. 1, '16	100	1.75
822	Bon Ton Molasses Feed	D. P. Reid & Bro., Inc., Norfolk, Va.	Matthews-Weeks & Co., Rocky Mount.	Dec. 8, '15	100	1.80
841	do.	do.	W. S. White & Co., Eliza- beth City.	Dec. 13, '15	100	1.55
851	do.	do.	F. G. Paul & Bro., Wash- ington.	Dec. 15, '15	100	1.85
1043	do.	do.	T. P. Nash, Elizabeth City.	Mar. 27, '16	100	1.60
842	Daisy Arabia Horse Feed	do.	W. S. White & Co., Eliza- beth City.	Dec. 13, '15	100	1.60
808	Rapier Red Wing Horse and Mule Feed.	Rapier Sugar Feed Co., Owensboro, Ky.	Adams Grain & Provision Co., Charlotte.	Nov. 20, '15	100	1.90
1071	Uncle Sam Horse and Mule Feed	Seaboard Feed & Produce Co., Henderson, N. C.	S. J. Stallings, Littleton	April 12, '16	100	1.85
867	Full Pail Dairy Feed	Southern Feed Co., New- port News, Va.	C. A. Dawson & Bro., Kinston.	Jan. 11, '16	100	1.75
1008	do.	do.	C. L. Spencer, New Bern	Mar. 19, '16	100	1.75
819	do.	do.	Matthews, Weeks & Co., Rocky Mount.		100	
1032	Economy Feed.	do.	L. M. Savage, Greenville	Mar. 23, '16	190	1.85
863	Turner's Mule Feed.	W. H. Turner, Winston- Salem, N. C.	Sink & Love, Winston- Salem.	Jan. 11, '16	100	1.75
782	Ideal Horse and Mule Feed.	John Wade & Sons, Mem- phis, Tenn.	Farmers Supply Co., Charlotte.	Nov. 10, '15	100	1.75
781	do.	do.	Charles Moody & Co., Charlotte.	Nov. 10, '15	100	1.80
900	do.	do.	do.	Jan. 26, '16	100	1.60
741	Top Notch Horse and Mule Feed.	do.	Elmore Maxwell Co., Greensboro.	Nov. 2, '15	100	1.65

RECAPITU

Mixed Feeds Containing Molasses

Guaranteed.....	.....
Found.....	.....
Deficient.....	.....
Range of deficiency..	.....
Range of excess.....	.....
Average deficiency..	.....
Average excess.....	.....

TAINING MOLASSES—Continued.

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
7209	Guaranteed..	10.0		2.8		12.0		Cracked corn, oats, ground grain screenings, alfalfa, salt, molasses.
	Found.....	10.1	.1	2.6	— .2	16.8	4.8	
771	Guaranteed..	9.0		2.0		15.0		C. S. meat, alfalfa, ground corn, oatmeal mill by-products, molasses.
	Found.....	9.4	.4	2.9	.9	15.5	.5	
707	Guaranteed..	10.0		3.0		15.0		Corn, oats, alfalfa, molasses.
	Found.....	9.9	— .1	2.4	— .6	16.5	1.5	
988	Guaranteed..							do.
	Found.....	13.0	3.0	1.8	— 1.2	13.2	— 1.8	
822	Guaranteed..	10.0		3.0		10.0		Alfalfa, oats, cracked corn, oatmeal mill by-products, molasses.
	Found.....	8.5	— 1.5	2.4	— .6	12.2	2.2	
811	Guaranteed..							do.
	Found.....	9.5	— .5	2.0	— 1.0	13.4	1.2	
851	Guaranteed..							do.
	Found.....	9.1	— .9	1.8	— 1.2	11.6	1.6	
1013	Guaranteed..							do.
	Found.....	9.1	— .6	1.7	— 1.3	20.0	10.0	
812	Guaranteed..							do.
	Found.....	9.6	— .4	2.9	— .1	12.7	2.7	
808	Guaranteed..	9.0		2.0		12.0		Alfalfa, rolled oats, cracked corn, oat clips, salt, molasses.
	Found.....	10.0	1.0	2.2	.2	13.7	1.7	
1071	Guaranteed..	10.0		2.0		15.0		Corn, oats, alfalfa, molasses.
	Found.....	10.1	.1	2.1	.1	13.9	— 1.1	
867	Guaranteed..	12.5		2.5		15.0		Cotton-seed meal, wheat bran, oat by-products, corn meal, molasses.
	Found.....	14.7	2.2	2.8	.3	12.5	— 2.5	
1008	Guaranteed..							do.
	Found.....	13.4	.5	2.6	.1	12.0	— 3.0	
811	Guaranteed..							do.
	Found.....	11.7	— .8	2.5		12.9	— 1.7	
1032	Guaranteed..	10.0		2.5		8.5		do.
	Found.....	13.4	3.4	2.0	— .5	11.0	2.5	
863	Guaranteed..	10.0		2.0		12.0		Corn, oats, alfalfa, molasses.
	Found.....	11.7	1.7	2.0		11.5	2.5	
782	Guaranteed..	10.0		2.0		11.0		do.
	Found.....	9.1	— .9	1.8	— .2	12.8	— 1.2	
781	Guaranteed..							do.
	Found.....	9.6	— .4	2.3	.3	13.3	— .7	
900	Guaranteed..							do.
	Found.....	9.9	.1	2.2	.2	11.8	— 2.2	
741	Guaranteed..	9.0		2.0		11.0		Corn, oats, alfalfa, ground prairie hay, salt, molasses.
	Found.....	11.6	2.6	2.1	.1	10.6	— 3.4	

LATION

Protein	Fat	Fiber
9.0% to 20.0%	1.5% to 3.8%	7.5% to 26.0%
8.5% to 21.9%	1.1% to 4.3%	6.8% to 20.6%
18 or 22.0%	29 or 36.0%	45 or 56.0%
0.1% to 7.4%	0.1% to 1.5%	0.1% to 9.5%
0.1% to 4.8%	0.1% to 2.3%	0.5% to 10.0%

POULTRY

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of package-Lbs.	Price of Package
703	Aunt Patsy's Poultry Feed.	Aunt Patsy's Poultry Feed Co., Memphis, Tenn.	G. C. Lovell Co., Mount Airy.	July 9, '15	100	\$2.50
883	do.....	do.....	W. L. Kluttz, Salisbury.....	Jan. 24, '16	100	3.00
1027	do.....	do.....	Gore & Co., Wilmington.....	Mar. 14, '16	100	2.40
768	Cluck Cluck Scratch Feed.	American Milling Co., Peoria, Ill.	Patterson Co., Greensboro	Nov. 8, '15	100	2.00
919	Blatchford's Fill the Basket Egg Mash.	Blatchford's Calf Meal Factory, Waukegan, Ill.	J. D. Earle Feed Co., Asheville.	Feb. 10, '16	100	3.00
769	Corno Hen Feed.....	Corno Mills Co., St. Louis, Mo.	Patterson Co., Greensboro	Nov. 8, '15	100	2.25
946	Globe Egg Mash.....	Albert Dickinson Co., Chicago, Ill.	L. R. Strecker, Asheville....	Feb. 17, '16	100	2.25
948	Globe Scratch Feed.....	do.....	do.....	Feb. 17, '16	100	2.25
1018	do.....	do.....	John S. McEachern Sons, Wilmington.	Mar. 13, '15	100	2.25
807	Pine Tree Scratch Feed.....	do.....	Adams Grain and Produce Co., Charlotte.	Nov. 30, '15	100	2.00
951	King Pigeon Feed.....	do.....	L. R. Strecker, Asheville....	Feb. 17, '16	100	2.30
912	Blue Hen Scratch Feed.....	Edgar-Morgan, Memphis, Tenn.	J. D. Earle Feed Co., Asheville.	Feb. 10, '16	25	.75
953	do.....	do.....	Sawyer & Stradley, Asheville.	Feb. 17, '16	50	1.50
801	O-U Scratch Feed.....	do.....	F. D. Barley & Co., Gastonia.	Nov. 30, '15	100	1.90
1013	Happy Hen Feed.....	do.....	J. W. Brooks, Wilmington.	Mar. 13, '16	100	2.25
947	Red Comb Poultry Feed.....	Edwards & Loomis Co., Chicago, Ill.	L. R. Strecker, Asheville....	Feb. 17, '16	100	2.25
7212	Chicken Feed No. 1.....	Grimes Milling Co., Salisbury, N. C.	Grimes Milling Co., Salisbury.	June 30, '15	-----	-----
7213	Chicken Feed No. 2.....	do.....	do.....	June 30, '15	-----	-----
830	Just Scratch Feed.....	Just Mills, Nashville, Tenn.	Wholesale Grocery Co., Tarboro.	-----	100	2.15
1017	Egg Mash.....	John S. McEachern Sons, Wilmington, N. C.	John S. McEachern Sons, Wilmington.	Mar. 13, '16	100	2.50
809	Monogram Poultry Feed.....	Moon-Taylor Co., Lynchburg, Va.	Purdie Hook Co., Dunn....	Dec. 7, '15	100	2.00
950	Chicken Feed.....	Purina Mills, St. Louis, Mo.	L. R. Strecker, Asheville....	Feb. 17, '16	100	2.30
1025	do.....	do.....	D. L. Gore Co., Wilmington.	Mar. 14, '16	100	2.25

FEEDS

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
703	Guaranteed	15.8		3.5		11.0		Corn, oats, alfalfa, shorts, meat scrap, oyster shell, C. S. meal, wheat bran.
	Found	16.0	.2	3.1	.4	7.9	3.1	
883	Guaranteed							do.
	Found	16.8	1.0	4.5	1.0	8.1	2.9	
1027	Guaranteed							do.
	Found	20.1	2.3	4.8	1.3	9.3	1.7	
768	Guaranteed	10.0		2.5		5.0		Corn, wheat, barley, Kaffir corn, sunflower seed, buckwheat.
	Found	11.1	1.1	3.6	1.1	2.2	2.8	
919	Guaranteed	19.0		4.0		10.0		Locust bran meal, unpressed flaxseed, wheat flour, barley meal, ground beans and peas, old process oil meal, cocoa shell meal, coconut meal, re-cleaned cottonseed meal, fennugreek, dried milk, anise, salt, alfalfa, barley, bone, corn and oat meal, wheat bran and middlings, beef scrap, fish, capsicum, powdered limestone. (Not confirmed.)
	Found	20.4	1.4	4.5	.5	7.5	2.5	
769	Guaranteed	10.0		3.5		5.0		Wheat, cracked corn, wheat screenings, Kaffir corn, or milo maize.
	Found	11.1	1.1	3.2	.3	2.2	2.8	
946	Guaranteed	15.0		3.0		10.0		Wheat bran, wheat middlings, alfalfa, ground corn bran, corn feed meal, linseed oil cake, meat scrap. (All ingredients not confirmed.)
	Found	13.3	2.3	3.4	.4	6.4	3.6	
948	Guaranteed	10.0		2.5		5.0		Wheat, corn, Kaffir corn, oats, millet.
	Found	9.9	.1	3.6	1.1	2.1	2.9	
1018	Guaranteed							do.
	Found	10.4	.4	2.8	.3	2.2	2.8	
807	Guaranteed	10.0		2.5		5.0		Corn, wheat, rye, barley, oats, buckwheat, sunflower, Kaffir corn.
	Found	10.6	.6	4.1	1.6	3.0	2.0	
951	Guaranteed	10.0		2.5		5.0		Corn, wheat, buckwheat, Kaffir corn, peas, millet, hemp.
	Found	10.3	.3	3.8	1.3	3.6	1.4	
912	Guaranteed	10.0		3.5		5.0		Wheat, Kaffir corn, corn, sunflower seed, barley, oats.
	Found	10.1	.1	3.2	.3	2.2	2.8	
953	Guaranteed							do.
	Found	9.5	.5	3.2	.3	2.0	3.0	
801	Guaranteed	10.0		3.5		5.0		Wheat, Kaffir corn, corn, oats, barley, wheat screenings.
	Found	11.6	1.6	3.7	.2	2.0	3.0	
1013	Guaranteed	10.0		3.5		5.0		Corn, oats, wheat, wheat screenings. (Barley also found.)
	Found	10.6	.6	2.7	.8	1.9	3.1	
947	Guaranteed	10.0		2.5		5.0		Wheat, cracked corn, Kaffir corn, barley, oats, sunflower seed, buckwheat.
	Found	10.2	.2	3.1	.6	2.3	2.7	
7212	Guaranteed							Cracked corn, wheat, oats, Kaffir corn.
	Found	10.0		3.0		1.7		
7213	Guaranteed							Cracked corn, wheat, oats, Kaffir corn, millet.
	Found	9.6		3.6		2.6		
830	Guaranteed	10.5		4.0		3.8		Wheat, cracked corn, barley, Kaffir corn, or milo maize, sunflower seed.
	Found	11.3	.8	3.4	.6	2.4	1.4	
1017	Guaranteed	12.0		3.0		5.0		Alfalfa, beef scrap, bran, chops, crushed oats, oil meal, middlings, charcoal, shells, grit. (All ingredients not confirmed.)
	Found	13.5	1.5	4.2	1.2	9.0	4.0	
809	Guaranteed	10.0		3.0		3.0		Wheat, corn, barley, Kaffir, milo maize, sunflower seed.
	Found	9.8	.2	2.4	.6	1.7	1.3	
950	Guaranteed	11.0		3.0		4.0		do.
	Found	9.7	1.3	3.4	.4	2.6	1.4	
1025	Guaranteed							do.
	Found	10.6	.6	2.9	.1	2.3	1.6	

POULTRY

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price of Package
949	Hen-O-Lay Scratch Feed	L. R. Strecker, Asheville, N. C.	L. R. Strecker, Asheville...	Feb. 17, '16	100	\$2.25
857	Star Cackle Feed.....	Southern Feed Co., Newport News, Va.	C. G. Morris, Washington	Dec. 15, '15	100	2.00
1049	Dixie Chicken Feed.....		T. P. Nash, Elizabeth City	Mar. 27, '16	100	2.35
732	Shawnee Brand Scratch Feed.	Woods, Stubbs & Co., Louisville, Ky.	Messick-Mack Co., Winston-Salem.	Sept. 13, '15	100	2.10
839	Rex Hen Feed.....	John Wade & Sons Memphis, Tenn.	Chas. Moody Co., Charlotte.	Jan. 26, '16	100	1.90
911	do.....	do.....	J. D. Earle Feed Co., Asheville.	Feb. 10, '16	100	2.25
1070	do.....	do.....	Littleton Feed & Grocery Co., Littleton.	April 10, '16	100	2.25
956	Royal Hen Feed.....	do.....	Parker & Clark, High Point.	Feb. 21, '16	100	2.25

RECAPITU

Poultry Feeds

Guaranteed .....	.....
Found .....	.....
Deficient .....	.....
Range of deficiency.....	.....
Range of excess.....	.....
Average deficiency.....	.....
Average excess .....	.....

COTTON-SEED

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price of Package
891	Cotton-seed Meal	Arey Oil Mill, Salisbury, N. C.	Peck Co., Salisbury	Jan. 26, '16	100	\$2.00
974	do	Bowen & Murphy, Birmingham, Ala.	Adams Grain and Provision Co., Asheville.	.....	100	2.00
765	Prime Standard C. S. Meal	Buckeye Cotton Oil Co., Charlotte, N. C.	Patterson Co., Greensboro	Nov. 8, '15	100	1.90
716	Cottonseed Meal	Buckeye Cotton Oil Co., Macon, Ga.	W. M. Farce, Grocery Co., Murphy.	April 5, '16	100	2.00

FEEDS—Continued.

Laboratory Number	Guaranteed and Found	Protein, Per cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
949	{ Guaranteed	10.0		3.5		5.0		Corn, oats, wheat, Kaffir, sunflower, barley.
	{ Found.....	9.7	— .3	4.4	.9	2.4	— 2.6	
857	{ Guaranteed	10.0		4.0		4.0		Cracked corn, wheat, barley, Kaffir, sunflower seed, oats.
	{ Found.....	11.5	1.5	3.7	— .3	2.0	— 2.0	
1043	{ Guaranteed	10.0		3.6		4.0		Cracked corn, oats, barley, Kaffir.
	{ Found.....	9.6	— .4	2.6	— 1.0	1.9	— 2.1	
732	{ Guaranteed	11.8		3.9		2.8		Corn, Kaffir corn, milo maize, red wheat, barley, sunflower.
	{ Found.....	11.3	— .5	3.2	— .7	1.9	— 0.9	
829	{ Guaranteed	10.0		3.0		5.0		Wheat, cracked corn, milo maize, sunflower seed, (Not enough sunflower seed to amount to anything.)
	{ Found.....	10.4	.4	3.1	.1	1.8	— 3.2	
911	{ Guaranteed	.....		.....		.....		do.
	{ Found.....	11.2	.8	3.2	.2	2.6	— 2.4	
1070	{ Guaranteed	.....		.....		.....		do.
	{ Found.....	9.4	— .6	3.4	.4	2.0	— 3.0	
956	{ Guaranteed	.....		.....		.....		Wheat, cracked corn, milo maize, barley.
	{ Found.....	9.8	— .2	3.9	.9	2.1	— 2.9	

LATION

Protein	Fat	Fiber
10.9% to 19.0%	2.5% to 4.0%	2.8% to 11.0%
9.1% to 20.4%	2.1% to 4.8%	1.7% to 9.3%
10 or 32.0%	11 or 34.0%	2.8 or 87.3%
0.1% to 2.3%	0.1% to 1.0%	0.9% to 3.6%
0.1% to 2.3%	0.1% to 1.6%	1.1% to 4.0%

.. .. .

MEAL

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
891	{ Guaranteed	38.6						.....
	{ Found.....	35.3	— 3.3	6.2	.....	12.0	.....
953	{ Guaranteed	38.6		6.0		12.0		.....
	{ Found.....	39.9	1.1	.....	.....	.....	.....
76	{ Guaranteed	38.6						.....
	{ Found.....	31.0	— 4.6	5.4	.....	12.8	.....
716	{ Guaranteed	38.6						.....
	{ Found.....	38.3	— .2	6.7	.....	12.1	.....

COTTON-SEED

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price of Package
7197	Cotton-seed Meal	Buckeye Cotton Oil Co., Charlotte, N. C.	E. P. Dale & Co., Charlotte.	May 24, '16	.....	\$.....
721	do.	Cowpens Cotton Oil Co., Cowpens, S. C.	W. H. King, Hendersonville.	July 17, '15	100	1.55
7158	do.	Chowan Cotton Oil and Fert. Co., Edenton, N. C.	H. C. Privatt, Edenton.	Mar. 28, '16	100	2.00
811	do.	Elba Manufacturing Co., Maxton, N. C.	H. G. Sutton, Dunn.	Dec. 7, '15	100	2.10
847	do.	Eastern Cotton Oil Co., Hertford, N. C.	W. S. White & Co., Elizabeth City.	Dec. 13, '15	100	1.90
7142	do.	do.	L. P. Ashford, New Bern.	Mar. 10, '16	100	2.00
7157	do.	do.	T. P. Nash, Elizabeth City	Mar. 27, '16	100	2.00
997	do.	Farmers' Warehouse Oil Mill, Mooresville, N. C.	W. M. Neel & Co., Mooresville.	Mar. 4, '16	100	2.00
7152	Prime Cotton-seed Meal	Home Oil Co., New Decatur, Ala.	J. D. Earle Feed Co., Asheville.	Mar. 3, '16	100	.....
913	do.	do.	do.	Feb. 10, '16	100	2.10
799	Standard Cotton-seed Meal.	Lancaster Cotton Oil Co., Lancaster, S. C.	Asheville Grocery Co., Asheville.	Nov. 29, '15	100	1.90
7166	Cotton-seed Meal	Louisburg Cotton Oil Mill, Louisburg, N. C.	Littleton Feed & Grocery Co., Littleton.	April 12, '16	100	1.90
864	do.	Lenoir Oil & Ice Co., Kinston, N. C.	C. A. Dawson & Bro., Kinston.	Jan. 14, '16	100	2.10
959	Standard Cotton-seed Meal.	Newton County Oil Mills, Covington, Ga.	Slayden Fakes Co., Bryson City.	Feb. 15, '16	100	2.00
7161	do.	Patrick Oil Co., Conyers, Ga.	Woffard-Faine Co., Murphy.	April 5, '16	100	2.00
7111	Cotton-seed Meal.	Raleigh Cotton Oil Co., Raleigh, N. C.	W. A. Myatt, Raleigh.	Feb. 17, '16	100	1.90
7149	do.	Robeson Mfg. Co., Lumberton, N. C.	D. L. Gore & Co., Wilmington.	Mar. 11, '16	1.00	1.90
7147	Standard Cotton-seed Meal.	Swift & Co., Atlanta, Ga.	J. W. Brooks, Wilmington.	Mar. 13, '16	100	2.00
887	Cotton-seed Meal.	Southern Cotton Oil Co., Charlotte, N. C.	Overman & Co., Salisbury	Jan. 21, '16	100	2.00
968	do.	do.	C. Call, North Wilkesboro	Feb. 21, '16	100	2.00
874	do.	Southern Cotton Oil Co., Goldsboro, N. C.	M. J. Best & Sons, Goldsboro.	Jan. 14, '16	100	2.00
840	do.	Southern Cotton Oil Co., Selma, N. C.	Thompson & Smith, Dunn.	Dec. 7, '15	100	2.25
7200	do.	Southern Cotton Oil Co., Sheffield, Ala.	Biltmore Milling Co., Biltmore.	May 5, '16	.....	.....
711	do.	Trent Cotton Oil Co., Pollocksville, N. C.	Maxwell & Pugh, New Bern.	Mar. 10, '16	100	2.05
806	Standard Cotton-seed Meal.	Taylor Commission Co., Atlanta, Ga.	Asheville Grocery Co., Asheville.	Nov. 29, '15	100	1.90
893	Cotton-seed Meal.	Union Seed & Fertilizer Co., Charlotte, N. C.	Cochran-McLaughton, Charlotte.	Jan. 26, '16	100	2.00
985	do.	do.	G. C. Lovell, Mount Airy	Mar. 1, '16	100	1.90

MEAL—Continued

Laboratory Number	Guaranteed and Found	Protein, Per Cent		Discrepancy		Fat, Per Cent		Discrepancy		Fiber, Per Cent		Discrepancy	
7197	Guaranteed	38.6											
	Found	37.8	— .8			6.2				10.0			
724	Guaranteed	36.0				6.0				12.0			
	Found	36.4	.1			8.0	2.0			12.3	.3		
7158	Guaranteed	38.6											
	Found	28.0	— 10.6			5.4				17.4			
811	Guaranteed	38.6				6.0				10.0			
	Found	37.6	— 1.0			6.9	.9			11.1	1.1		
847	Guaranteed	38.6											
	Found	32.3	— 6.3			6.5				15.0			
7142	Guaranteed												
	Found	36.4	— 2.2			7.0				12.4			
7157	Guaranteed												
	Found	34.1	— 2.0			6.3				13.0			
997	Guaranteed	38.6											
	Found	38.9	.3			8.9				7.9			
7152	Guaranteed	38.6				6.0				12.0			
	Found	38.3	— .3			6.3	.3			11.2	.8		
913	Guaranteed												
	Found	36.4	— 2.2										
799	Guaranteed	38.6											
	Found	40.5	1.9			7.8				9.8			
7166	Guaranteed	38.6											
	Found	37.7	— .9			7.0				9.9			
864	Guaranteed	38.6											
	Found	40.4	1.8			6.9				8.7			
939	Guaranteed	38.6											
	Found	37.6	— 1.0			6.9				10.8			
7164	Guaranteed	38.6											
	Found	28.6	— 0.0			6.0				9.4			
7111	Guaranteed	38.6											
	Found	37.2	— 1.4			7.0				10.6			
7149	Guaranteed	38.6											
	Found	39.3	.7			7.1				11.1			
7147	Guaranteed	38.6				6.0				12.0			
	Found	39.1	.5			6.3	.3			11.5	.5		
887	Guaranteed	38.6											
	Found	35.9	— 2.7			6.2				11.7			
968	Guaranteed	38.6											
	Found	34.8	— 3.8			6.1				12.9			
874	Guaranteed	38.6											
	Found	38.2	— .4			7.0				10.3			
810	Guaranteed	38.6											
	Found	32.4	— 6.4			6.0				13.4			
7202	Guaranteed	38.6				5.0				10.0			
	Found	38.5	— .1			7.5	2.5			10.4	.4		
7143	Guaranteed	38.6											
	Found	36.3	— 2.3			7.1				12.4			
800	Guaranteed	38.6				6.0				12.0			
	Found	37.8	— .6			6.4	.4			12.7	.7		
894	Guaranteed	38.6											
	Found	33.6	— 5.0			5.9				13.1			
598	Guaranteed	38.6											
	Found	33.8	— 4.8			6.3				11.6			

Ingredients

COTTON-SEED

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package—Lbs.	Price of Package
1051	Cotton-seed Meal	Union Seed & Fertilizer Co., Henderson, N. C.	E. H. & M. V. Lawrence, Durham.	Mar. 29, '16	100	2.00
7167	do	do	Weldon Grocery Co., Weldon.	April 11, '16	100	1.90
7148	do	Union Seed & Fertilizer Co., Wilmington, N. C.	John S. McEachern Sons, Wilmington.	Mar. 13, '16	100	2.39
7150	do	do	D. L. Gore Co., Wilmington.	Mar. 14, '16	100	2.00

I

RECAPITU

Cotton Seed Meal

Guaranteed.....
Found.....
Deficient.....
Range of deficiency.....
Range of excess.....
Average deficiency.....
Average excess.....

*Only six meals were guaranteed as to fat and fiber.

COTTON-SEED

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package—Lbs.	Price of Package
791	Colonial Cotton-seed Feed	Colonial Cereal Co., Norfolk, Va.	S. W. Y. Supply Co., Elkin.	Nov. 28, '15	100	\$1.75
898	Cyclone Cotton-seed Feed	Memphis Cotton Hull & Fiber Co., Memphis, Tenn.	Chas. Moody Co., Charlotte.	Jan. 26, '16	100	1.85
1061	do	do	Wofford-Faine Grocery Co., Murphy.	April 5, '16	100	1.75
1023	do	do	D. L. Gore Co., Wilmington.	Mar. 11, '16	100	1.90
1015	do	do	Pippin & Woolard, Washington.	Mar. 28, '16	100	1.75
717	Creamo Brand Cotton-seed Feed.	Tennessee Fiber Co., Memphis, Tenn.	Asheville Grocery Co., Asheville.	July 16, '15	100	1.45
752	do	do	W. H. Turner, Winston-Salem.	Nov. 13, '15	100	1.75
797	do	do	Asheville Grocery Co., Asheville.	Nov. 29, '15	100	1.85

MEAL—Continued.

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
1052	{ Guaranteed	38.8	—	6.3	—	12.1	—	
	{ Found	38.6	.2	6.3	—	12.1	—	
7165	{ Guaranteed	38.6	—	6.4	—	10.1	—	
	{ Found	37.3	1.3	6.4	—	10.1	—	
7148	{ Guaranteed	38.6	—	6.3	—	11.4	—	
	{ Found	37.9	.7	6.3	—	11.4	—	
7150	{ Guaranteed	38.6	—	7.7	—	10.1	—	
	{ Found	39.0	.4	7.7	—	10.1	—	

LATION

Protein	Fat	Fiber
36.0% to 38.6%	*5.0% to 6.0%	*10.0% to 12.0%
28.0% to 40.5%	5.1% to 7.8%	7.9% to 11.4%
23 or 66.0%	0 or 0.0%	*2 or 33.6%
0.1% to 10.6%	0.0% to 0.0%	*0.5% to 0.8%
0.1% to 1.9%	0.3% to 2.5%	*0.3% to 1.1%

FEED

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
791	{ Guaranteed	20.0	—	4.0	—	25.0	—	
	{ Found	16.9	3.1	3.8	—	25.0	—	.6 Cotton-seed meal, fine ground cotton-seed hulls.
898	{ Guaranteed	20.0	—	3.0	—	23.0	—	
	{ Found	19.8	.2	3.2	—	23.6	.6	do.
1061	{ Guaranteed	20.1	—	3.7	—	21.5	—	
	{ Found	20.1	.1	3.7	.7	21.5	— 1.5	do.
1023	{ Guaranteed	20.3	—	3.8	—	21.0	—	
	{ Found	20.3	.3	3.8	.8	21.0	— 2.0	do.
1048	{ Guaranteed	20.0	—	4.1	—	24.4	—	
	{ Found	20.0	—	5.0	—	22.0	— 1.4	do.
717	{ Guaranteed	20.0	—	4.2	—	19.6	—	
	{ Found	23.9	3.9	4.2	—	19.6	— 2.4	do.
752	{ Guaranteed	20.5	—	3.8	—	19.6	—	
	{ Found	20.5	.5	3.8	— 1.2	19.6	— 2.4	do.
797	{ Guaranteed	20.6	—	3.2	—	23.8	—	
	{ Found	20.6	.6	3.2	— 1.8	23.8	— 1.8	do.

COTTON-SEED

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of package—Lbs.	Price of Package
850	Creamo Brand Cotton- seed Feed.	Tennessee Fiber Co., Memphis, Tenn.	F. G. Paul & Bro., Wash- ington.	Dec. 15, '15	100	\$1.65
933	do.	do.	Adams Grain & Grocery Co., Asheville.		100	1.60
893	do.	do.	Slayden-Fakes & Co., Asheville.	Feb. 14, '16	100	1.60
910	do.	do.	Slayden-Fakes & Co., Fryson City.	Feb. 15, '16	100	1.70
993	do.	do.	A. G. Bowman, Mount Airy.	Mar. 1, '16	100	1.90
994	do.	do.	W. B. Haymore, Mount Airy.	Mar. 1, '16	100	1.75
1011	do.	do.	Armstrong Grocery Co., New Bern.	Mar. 10, '16	100	1.90
1028	do.	do.	B. F. Mitchell Co., Wil- mington.	Mar. 14, '16	100	1.90
7186	do.	do.	Farmer's Union Merc. Co., Liberty.	Mar. 24, '16		
7200	Cotton-seed Feed Meal	Home Oil Mill, New De- catur, Ala.	W. H. McCure, Hazel- wood.	April 28, '16	100	
7201	do.	do.	H. R. Patton, Swannanoa	May 5, '16	100	
9667	Per Cent Cotton Seed	Southern Cotton Oil Co., Charlotte, N. C.	S. V. Tomlinson, North Wilkesboro.	Feb. 28, '16	100	1.95
970	do.	do.	F. D. Forester Co., North Wilkesboro.	Feb. 28, '16	100	1.90
762	Cold Pressed Cotton-seed Flake.	Mount Gilead Cotton Oil Co., Mount Gilead, N. C.	Farmers' Union Agency Co., Winston-Salem.	Nov. 8, '15	100	1.50
958	do.	do.	Parker & Clark, High Point.	Feb. 21, '16	100	1.90

RECAPITU

Cotton Seed Feed

Guaranteed	.....
Found	.....
Deficient	.....
Range of deficiency	.....
Range of excess	.....
Average deficiency	.....
Average excess	.....

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
850	Guaranteed	.....	.....	.....	.....	.....	.....	Cotton-seed meal, fine ground cotton-seed hulls
	Found.....	20.3	.3	3.8	1.2	22.6	.6	
933	Guaranteed	.....	.....	.....	.....	.....	.....	do.
	Found.....	22.5	2.5	3.9	1.1	22.9	.9	
938	Guaranteed	.....	.....	.....	.....	.....	.....	do.
	Found.....	22.3	2.3	4.7	.3	22.4	.4	
940	Guaranteed	.....	.....	.....	.....	.....	.....	do.
	Found.....	21.4	1.4	3.6	1.4	21.0	2.0	
993	Guaranteed	.....	.....	.....	.....	.....	.....	do.
	Found.....	21.6	1.6	3.7	1.3	22.4	.4	
994	Guaranteed	.....	.....	.....	.....	.....	.....	do.
	Found.....	20.2	.2	4.5	.5	23.6	1.6	
1011	Guaranteed	.....	.....	.....	.....	.....	.....	do.
	Found.....	20.0	.....	3.5	1.5	23.8	1.8	
1028	Guaranteed	.....	.....	.....	.....	.....	.....	do.
	Found.....	22.5	2.5	4.3	.7	22.5	.5	
7186	Guaranteed	.....	.....	.....	.....	.....	.....	do.
	Found.....	20.0	.....	4.5	.....	25.0	.....
7200	Guaranteed	.....	.....	.....	.....	.....	.....	do.
	Found.....	20.2	.2	3.8	.7	24.5	.5	
7201	Guaranteed	.....	.....	.....	.....	.....	.....	do.
	Found.....	36.0	.....	.....	.....	12.0	.....
966	Guaranteed	.....	.....	.....	.....	.....	.....	do.
	Found.....	32.0	4.0	6.5	.....	13.8	1.8	
970	Guaranteed	.....	.....	.....	.....	.....	.....	do.
	Found.....	34.6	1.4	6.5	.....	12.9	.9	
762	Guaranteed	.....	.....	.....	.....	.....	.....	do.
	Found.....	36.0	.....	6.0	.....	15.0	.....
958	Guaranteed	.....	.....	.....	.....	.....	.....	do.
	Found.....	35.3	.7	5.7	.3	11.8	3.2	
762	Guaranteed	.....	.....	.....	.....	.....	.....	do.
	Found.....	33.4	2.6	5.6	.9	11.6	3.4	
958	Guaranteed	.....	.....	.....	.....	.....	.....	do.
	Found.....	26.0	.....	8.0	.....	20.0	.....
958	Guaranteed	.....	.....	.....	.....	.....	.....	do.
	Found.....	25.9	.1	7.0	1.0	20.0	0.0	
958	Guaranteed	.....	.....	.....	.....	.....	.....	do.
	Found.....	22.0	4.0	4.2	3.8	24.6	4.6	

LATION

Protein	Fat	Fiber
20.0% to 36.0%	3.0% to 8.0%	12.0% to 25.0%
16.9% to 35.3%	3.2% to 7.0%	11.6% to 25.0%
7 or 30.0%	17 or 73.0%	7 or 30.0%
0.1% to 4.0%	0.3% to 3.8%	0.5% to 3.4%
0.1% to 3.9%	0.2% to 1.1%	0.4% to 4.6%
.....
.....

CRACKED CORN, CORN

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package—Lbs.	Price of Package
1007	Corn Chops.....	Boney & Harper, Wilming- ton, N. C.	C. L. Spencer, Wilming- ton.	Mar. 10, '16	100	\$....
1015	do.....	do.....	John S. McEachern & Sons, Wilmington.	Mar. 13, '16	100	1.80
818	Cracked Corn.....	Colonial Cereal Co., Nor- folk, Va.	J. A. Woodard-Holmes Co., Edenton.	Dec. 14, '15	100	1.75
859	Corn Chops.....	Forsyth Roller Mills, Winston-Salem, N. C.	Hege & Stewart, Winston- Salem.	Jan. 11, '16	100	1.75
880	Chopped Corn.....	Grimes Milling Co., Salisbury, N. C.	H. Z. White, Salisbury.....	Jan. 24, '16	100	1.65
700	Cow Chops.....	Granite City Mills, Mount Airy, N. C.	Mount Airy Feed Store, Mount Airy.	July 9, '15	100	1.75
1050	Cracked Corn.....	Jonathan Havan, Wash- ington, N. C.	Pippin & Woolard, Wash- ington.	Mar. 28, '16	100	1.80
1066	do.....	Mayo Milling Co., Rich- mond, Va.	Thomas Jobbing Co., Weldon.	April 11, '16	100	1.85
1061	do.....	H. F. Munt, Petersburg, Va.	Weldon Grocery Co., Weldon.	April 11, '16	100	1.90
734	Feed Corn Meal.....	M. O. Peters Mill Co., Omaha, Neb.	C. B. Gill & Co., Raleigh.	Sept. 15, '15	100	1.90
816	Cracked Corn.....	D. P. Reid & Bro., Nor- folk, Va.	Matthews Weeks & Co., Rocky Mount.	Dec. 8, '15	100	1.10
1017	do.....	do.....	Woodard-Holmes, Edenton.	Mar. 28, '16	100	1.80
838	do.....	W. S. White Co., Eliza- beth City, N. C.	T. P. Marsh, Elizabeth City.	Dec. 13, '15	100	1.55
839	do.....	do.....	W. S. White & Co., Eliza- beth City.	Dec. 13, '15	100	1.45

RECAPITU

Cracked Corn, Corn Chops, Corn Meal

Guaranteed.....	...
Found.....	.....
Deficient.....	.....
Range of deficiency.....	.....
Range of excess.....	.....
Average deficiency.....	.....
Average excess.....	.....

CHOPS, CORN MEAL

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
1007	Guaranteed	9.0		7.0		9.0		
	Found	9.7	.7	7.5	.5	7.0	2.0	
1015	Guaranteed	9.0		8.0		6.1		
	Found	9.0	0.0	8.0	1.0	6.1	2.9	
848	Guaranteed	8.0		3.0		4.0		
	Found	8.1	.1	4.2	1.2	4.7	2.3	
859	Guaranteed	9.9		3.9		2.0		
	Found	8.8	1.1	4.5	.6	1.5	.5	
880	Guaranteed							
	Found	7.7		3.8		4.1		
709	Guaranteed	9.5		3.9		6.5		
	Found	10.0	1.1	2.7	1.2	4.7	1.8	
1050	Guaranteed	8.0		3.0		3.0		
	Found	8.5	.5	3.7	.5	4.7	1.3	
1066	Guaranteed	10.0		4.0		3.0		
	Found	8.3	1.7	3.8	.2	1.5	1.5	
1064	Guaranteed	10.0		4.3		3.0		
	Found	8.6	1.4	4.3	0.0	1.9	1.1	
734	Guaranteed							
	Found	7.4		2.2		1.2		
816	Guaranteed	8.0		4.0		6.0		
	Found	8.4	.4	4.0	0.0	1.7	4.3	
1047	Guaranteed							
	Found	9.1	.7	4.5	.5	1.7	4.1	
838	Guaranteed	8.8		4.5		2.0		
	Found	8.8	0.0	4.8	.3	3.6	1.6	
839	Guaranteed							
	Found	8.1	.7	4.3	.2	1.5	.5	

LATION

Protein	Fat	Fiber
8.0% to 10.0%	3.0% to 7.0%	2.0% to 9.0%
7.4% to 10.6%	2.2% to 8.0%	1.5% to 7.0%
4 or 33.0%	3 or 25.0%	10 or 83.0%
0.7% to 1.7%	2.0% to 1.2%	0.5% to 2.9%
0.1% to 1.1%	3.0% to 1.2%	1.6% to 2.0%

BEET PULP, CALF MEAL, CORN GLUTEN,

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package—Lbs.	Price of Package
1053	Dried Beet Pulp.....	Charles Pope, Chicago, Ill.	E. H. & M. V. Lawrence, Durham.	Mar. 29, '16	100	\$1.65
836	do.....	Larowe Milling Co., De- troit, Mich.	T. P. Nash, Elizabeth City.	Dec. 13, '15	100	1.50
975	do.....	Lindsey, Robinson & Co., Roanoke, Va.	Williams & Snow, Elkin	Feb. 28, '16	100	1.75
920	Blatchford's Pig Meal.....	Blatchford Calf Meal Fac- tory, Waukegan, Ill.	J. D. Earle Feed Co., Asheville.	Feb. 10, '16	100	3.25
921	Blatchford's Calf Meal.....	do.....	do.....	Feb. 10, '16	100	3.75
742	Blatchford's Milk and Egg Mash.	do.....	Elmore-Maxwell Co., Greensboro.	Nov. 2, '15	25	.75
922	do.....	do.....	J. D. Earle Feed Co., Asheville.	Feb. 10, '16	100	3.25
730	Ryde's Cream Calf Meal	Ryde & Co., Chicago, Ill.	Davidson & Wolfe, Charlotte.	Sept. 9, '15	25	1.00
728	Schumacher's Calf Meal	Quaker Oats Co., Chicago, Ill.	C. L. Spencer, New Bern	Aug. 19, '15	-----	-----
760	Douglas Corn Gluten Feed	Douglas Co., Cedar Rapids, Iowa.	Farmers' Union Agency Co., Winston-Salem.	Nov. 8, '15	100	1.75
735	Buffalo Corn Gluten Feed	Corn Products Co., New York, N. Y.	Elmore-Maxwell Co., Greensboro.	Nov. 2, '15	100	1.55
1020	Diamond Hog Feed.....	do.....	John S. McEachern Sons, Wilmington.	Mar. 13, '16	100	1.90
733	M V C O Dried Grains	Milwaukee Vinegar Co., Cudahy, Wis.	Elmore-Maxwell Co., Greensboro.	Sept. 10, '15	75	1.35
952	Darling's Meat Scrap.....	Van Iderstine Co., Long Island City, N. Y.	L. R. Stecker, Asheville	Feb. 17, '16	100	3.25
1026	Rice Meal.....	Carolina Rice Mills, Golds- boro, N. C.	R. P. Peters Grocery Co., Tarboro.	Mar. 24, '16	100	1.65

FEED MEAT SCRAP, RICE MEAL

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
1053	{ Guaranteed.....	8.0		.5		20.0		
	{ Found.....	8.0		1.4	.9	16.0	- 3.1	Dried beet pulp.
836	{ Guaranteed.....	8.0		.5		20.0		
	{ Found.....	8.5	.5	.4	.1	19.8	-.2	do.
975	{ Guaranteed.....	8.0		.5		20.0		
	{ Found.....	7.8	-.2	.9	.4	16.7	- 3.3	do.
								Linseed oil meal, wheat flour, oat meal, wheat flour, corn meal, rice polish, barley meal, re-cleaned C. S. meal, cocoa shell meal, bean meal, crushed flaxseed, fenugreek, salt. (Not confirmed.)
920	{ Guaranteed.....	18.0		5.0		7.0		
	{ Found.....	17.8	-.2	4.7	-.3	6.9	-.1	
								Locust bean meal, unpressed flaxseed, wheat flour, barley meal, ground beans and peas, old process oil meal, cocoa shell meal, cocoanut meal, re-cleaned C. S. meal, fenugreek, dried milk, anise, salt.
921	{ Guaranteed.....	24.0		5.0		6.8		
	{ Found.....	25.0	1.0	6.0	1.0	6.5	-.3	The foregoing and: bone, corn, oat meal, wheat middlings, beef scrap, fish, limestone. (Not confirmed.)
742	{ Guaranteed.....	20.0		4.0		7.5		
	{ Found.....	18.5	- 1.5	4.5	.5	7.4	-.1	do.
922	{ Guaranteed.....							
	{ Found.....	21.1	1.4	4.4	.4	5.7	- 1.8	do.
								Carob beans, flaxseed, wheat flour, C. S. meal, beans and lentils, cocoa meal, fenugreek, anise, salt. (Not confirmed.)
730	{ Guaranteed.....	25.0		5.0		6.0		
	{ Found.....	22.6	- 2.4	4.9	-.1	5.3	- 0.7	Oatmeal, wheat meal, flaxseed meal, casein, C. S. meal, bi-carbonate of soda. (Not confirmed.)
728	{ Guaranteed.....	19.0		8.0		3.0		
	{ Found.....	17.5	- 1.5	5.0	- 3.0	2.5	- 0.5	
760	{ Guaranteed.....	23.0		1.0		8.0		
	{ Found.....	23.0		2.5	1.5	6.4	- 1.6	Corn Gluten feed.
735	{ Guaranteed.....	23.0		1.0		8.5		
	{ Found.....	19.6	- 3.4	7.8	6.8	16.5	8.0	do.
1020	{ Guaranteed.....	18.0		7.5		13.0		
	{ Found.....	17.5	-.5	14.7	6.9	8.7	5.5	Corn oil cake meal.
732	{ Guaranteed.....	21.0		5.0		12.9		
	{ Found.....	17.8	- 3.2	7.9	2.0	13.0	.1	Dried grains.
952	{ Guaranteed.....	55.0		5.0		3.0		
	{ Found.....	55.3	.9	12.1	7.1	2.3	-.7	Meat scrap.
1030	{ Guaranteed.....	11.5		8.5		11.5		
	{ Found.....	12.0	.5	11.3	3.4	7.5	- 4.0	Rice meal.

MISCELLANEOUS

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs	Price of Package
7096	Soy Bean Meal.....	Winterville Cotton Oil Co., Winterville, N. C.		Jan. 13, '16	3	
7092	do.....	Elizabeth City Oil Co., Elizabeth City, N. C.		Jan. 17, '16		
7179	do.....	Winterville Cotton Oil Co., Winterville, N. C.		May 24, '16		
7101	Velvet Bean.....	H. J. Faison, Faison, N. C.		Feb. 9, '16		
7069	Peanut Meal.....	D. L. Gore, Wilmington, N. C.		Nov. 10, '15		
7054	do.....	P. S. Shields, Scotland, Neck, N. C.		Oct. 14, '15		
7059	do.....	Universal Oil Co., Wil- mington, N. C.		Oct. 29, '15		
7058	Peanut Cake.....	do.....		Oct. 29, '15		
1022	Peanut Meal.....			Aug. 1, '16		
7065	Whole Peanut (raw).....	These are all from the same lot of peanuts, differing merely in being, or not being, parched.....		Nov. 11, '15		
7063	Parched Peanut Kernels.....			Nov. 11, '15		
7062	Peanut Skins (parched).....			Nov. 11, '15		
7060	Parched Peanut Hulls.....			Nov. 11, '15		
7064	Raw Peanut Hulls.....			Nov. 11, '15		
7061	Parched Peanut Hulls with Skins.....			Nov. 11, '15		
7140	Peanut Hulls (unground)	Virginia Mills, Suffolk, Va		Mar. 22, '16		
7141	Peanut Hulls (ground)	do.....		Mar. 22, '16		
7172	Corn Cob Meal.....	G. E. Patterson & Co., Memphis, Tenn.		April 26, '16		
7080	do.....	W. C. Jordan, Henderson- ville, N. C.		Dec. 22, '15		
7188	C. S. Hull Bran.....	East St. Louis, Ill.		May 20, '16		
7187	Lintless C. S. Hulls.....		Barbee & Goodwin, Raleigh.	May 20, '16		
7138	Flax Bran.....		Raleigh Grain & Milling Co., Raleigh.	Mar. 11, '16		
7104	do.....		do	Feb. 15, '16		
7060	Crushed Corn and Cob.....	O. W. Clayton, Brevard, N. C.		Nov. 4, '15		
7087	do.....	W. C. Jordan, Henderson- ville.		Dec. 22, '15		
7171	Cob Meal and C. S. Meal.....	G. E. Patterson & Co., Memphis, Tenn.		April 26, '16		
7020	Cudzu Vine (air-dry)*.....					

*Moisture (dried in air in steam bath) 11.0%; ash, 8.4%; nitrogen—free extract—31.2%; carbohydrate, 56.2%. length was 28 ft. 3 in. It bore only five full-grown and one one-fourth grown leaves. It weighed 140.5 grams vine, cut into ½ inch lengths and dried in air lost 85.2 per cent.

(UNOFFICIAL)

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
7096	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	47.8	.....	6.8	.....	4.2	.....
7092	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	47.5	.....	5.5	.....	4.6	.....
7179	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	50.3	.....	5.0	.....	4.4	.....
7101	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	18.9	.....	4.0	.....	8.6	.....	Crushed in feed mill.
7069	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	30.8	.....	9.0	.....	24.0	.....	The whole peanut less the oil expressed
7054	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	31.5	.....	8.8	.....	21.6	.....	do.
7059	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	30.6	.....	9.0	.....	20.9	.....	do.
7058	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	30.6	.....	8.0	.....	21.6	.....	do.
		30.0	.....	8.0	.....	26.0	.....
1022	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	32.8	.....	9.1	.....	24.0	.....	do.
7065	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	20.1	.....	32.9	.....	19.8	.....	Whole peanut (hulls, skins, kernels), not parched.
7063	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	27.5	.....	51.0	.....	1.6	.....	Parched peanut kernels without hulls or skins.
7062	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	12.0	.....	.....	.....	.....	.....	Skins from parched peanuts (no hulls or kernels).
7060	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	4.8	.....	0.5	.....	71.6	.....	Hulls from parched peanuts, not including skins.
7064	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	4.2	.....	0.5	.....	67.5	.....	Hulls from unparched peanuts, not including skins.
7061	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	5.1	.....	1.1	.....	65.0	.....	Hulls from parched peanuts, including skins.
7140	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	7.1	.....	1.5	.....	61.8	.....
7141	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	6.7	.....	1.6	.....	60.0	.....	Same as 7140, except that they were ground
7172	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	3.2	.....	0.8	.....	30.6	.....	Ground corn cob.
7080	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	2.8	.....	0.7	.....	27.9	.....	Ground corn cob. (Moisture, 10.1 per cent; ash, 1.0 per cent; nitrogen-free extract—58.4 per cent.)
7182	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	3.2	.....	0.7	.....	36.4	.....
7187	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	2.9	.....	0.4	.....	35.5	.....
7138	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	7.0	.....	3.1	.....	39.4	.....
7104	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	6.4	.....	2.0	.....	43.2	.....
7060	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	8.4	.....	3.4	.....	4.2	.....	The corn and the cob naturally going with it.
7087	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	8.0	.....	3.8	.....	6.5	.....	The corn and the cob naturally going with it. (Moisture, 13.0 per cent; ash, 1.8 per cent; nitrogen-free extract—67.1 per cent.)
7171	{ Guaranteed.....	24.2	.....	4.2	.....	18.1	.....	50 per cent C. S. meal; 50 per cent cob meal
	{ Found.....	24.3	.....	4.4	.....	18.0	.....
7020	{ Guaranteed.....	.....	.....	.....	.....	.....	.....
	{ Found.....	19.7	.....	1.7	.....	25.0	.....

This Cudzu vine was the forward or growing end (10 ft. 3 in. long), cut June 10, 1915, from a vine whose total when cut, and only 25 grams, 5 and 11 days after; that is, it lost 82.2 per cent on becoming air dry. Another

LEAF TOBACCO REPORT FOR OCTOBER, 1916.

Pounds sold for producers.....	46,941,590
Pounds sold for dealers.....	1,945,137
Pounds sold for warehouses.....	3,095,011
Total	<u>51,981,738</u>

THE BULLETIN
OF THE
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE
RALEIGH

Vol. 37, No. 12

DECEMBER, 1916

Whole No. 227

PEACH GROWING IN NORTH CAROLINA



PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Postoffice at Raleigh, N. C., as second-class matter,
February 7, 1901, under Act of June 6, 1900.

EDWARDS & BROUGHTON PRINTING COMPANY
STATE PRINTERS

LETTER OF TRANSMITTAL

RALEIGH, N. C., November 27, 1916.

HON. W. A. GRAHAM,

Commissioner of Agriculture.

SIR:—I herewith submit the results of experimental work carried on under my direction on the Substations and observations made in commercial orchards throughout the State, and recommend that this be published as the December BULLETIN of the Department of Agriculture series.

Respectfully submitted,

W. N. HUTT,

State Horticulturist.

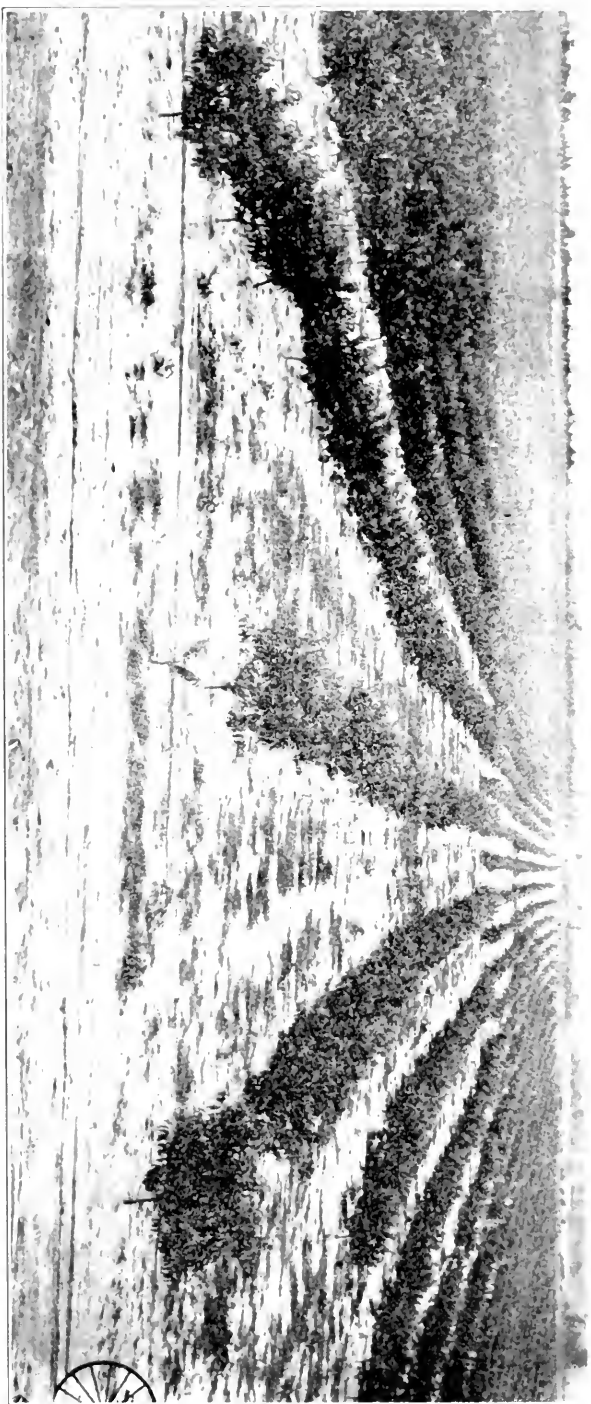


FIG. 2. Commercial orchard in Sand Hills.

PEACH GROWING IN NORTH CAROLINA

By C. D. MATTHEWS, ASSISTANT HORTICULTURIST

INTRODUCTION

A large amount of interest has been taken both in the growing of commercial orchards and in the production of peaches for local markets during the past few years. As a result of this wide and growing interest regarding peach production in this State, numerous requests for information have been directed to the Division of Horticulture from prospective growers. At the same time, numerous requests have been received from peach growers for information regarding the different practices of peach culture.

To collect information and at the same time to become acquainted with the most important problems of peach growing so as to initiate the most valuable experimental work, the writer has spent much time in the commercial orchards of the State during the past two seasons. To supply the information collected in an available form, this bulletin has been written.

HISTORY OF COMMERCIAL PEACH GROWING IN NORTH CAROLINA

Commercial peach growing in North Carolina is of comparatively recent origin. While there had been numerous isolated orchards, the first of really commercial importance was planted near Southern Pines in Moore County in 1892 by J. Van Lindley, and consisted of 50,000 trees. The trees grew favorably and the owners expected to make a fortune out of the orchard in a few years. The first crop was harvested in 1895, from three-year-old trees, and was very encouraging.

There was a small orchard about a quarter of a mile away which was infested with the San José Scale. The trees had been secured from a nurseryman in New Jersey who was not aware that he had the scale in his nursery. In 1896 the San José Scale broke out in the Lindley orchard. The infested trees were cut out, but the scale continued to spread. In 1897 the whole orchard was covered and Mr. Lindley had the remainder of the 50,000 trees dug up and burned, as it was not then known how to control the scale. Not discouraged by this ill fortune, Mr. Lindley planted an additional one hundred acres to peaches soon after this. These trees were infested with the scale too, but by this time entomologists were recommending kerosene emulsion as a means of control. This spray was found to be effective; but in spraying, not only the scale, but about 10 per cent of the trees were killed

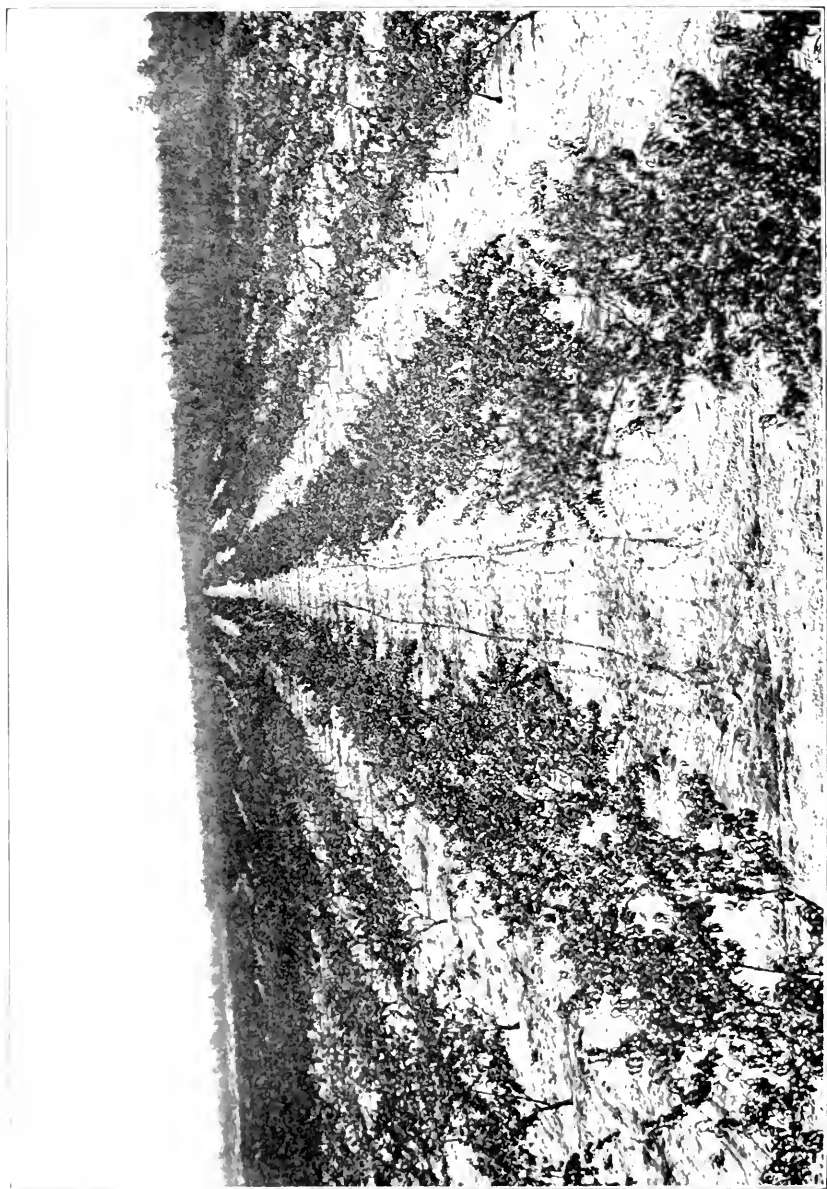


FIG. 3. Old commercial orchard in Sand Hills. Note sandy character of soil and clean tillage.

each season. The orchard produced enough fruit each year to pay expenses and a small dividend, occasionally, but was troubled with curenlio and brown rot. In 1903 the trees were sprayed with lime-sulphur, which was found to control the scale perfectly. In 1905 sprays were used to control the curenlio and brown rot. At this date Mr. Lindley began making additional plantings, and in 1909 the most successful returns were secured.

Encouraged by the success of Mr. Lindley, other commercial ventures were started in Moore and Montgomery counties, until now the area known as the Sand Hill Section, occupied by these counties, is looked upon as the leading commercial peach section in the State. During the last two years there has been fully 250,000 trees planted in commercial orchards in the Sand Hills alone.

Stimulated by large plantings of peaches in Georgia, and the success of commercial ventures in Virginia and West Virginia, the development of commercial orchards in the mountains in the western part of the State has been begun within the last decade. Growers were encouraged to plant commercial orchards because trees in the home orchards yielded crops almost every year. While in size the industry is small compared to that developed in the Sand Hill region, the outlook for future growth is favorable. The principal orchards are located in the counties of Surry and Yadkin.

Outside of these two sections, only isolated commercial orchards are found. Commercial peach growing in North Carolina is still practically in its infancy, but plantings are gradually increasing in the main peach sections.

THE SAND HILL SECTION

The topography of the Sand Hill Section is decidedly pronounced. The highest portions have an elevation of from 400 to nearly 600 feet above sea level, while the creeks have an elevation of from 100 to 200 feet lower. The rivers of the section have an elevation of between 100 and 200 feet above sea level.

The soil is sandy from the top of the hills to the lowest elevations. The sand varies in depth, but has been found in some places to extend to a depth of nearly 200 feet. On account of the character of the surface and the prevalence of the sandy soil, the section has been termed the "Sand Hills" or "Sand Hill Region."

The predominating soil types in this section are what are known as Norfolk coarse sand, Sand Hill phase, and Norfolk coarse sand, both of which are soils of gray color, with gray to yellow subsoil, and well drained.

The Norfolk coarse sand, in its typical development, consists of light, medium to coarse sand, 5 to 11 inches deep, underlain by a light yellow to grayish-yellow, medium to coarse sand.

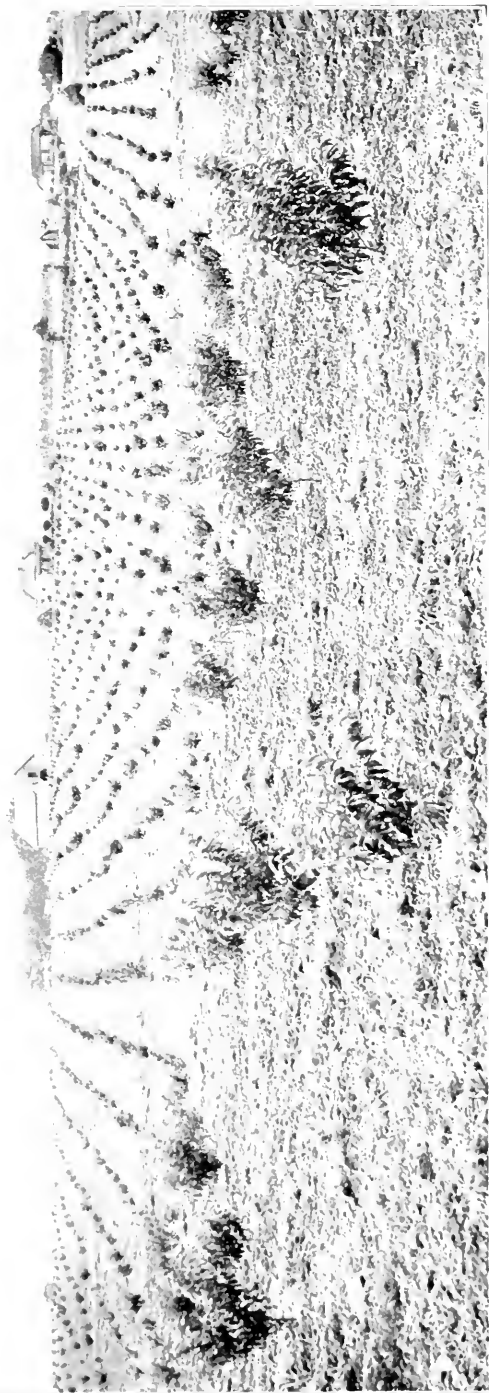


FIG. 4. Young commercial orchard in Piedmont Section. Note rolling character of land, which affords water and atmospheric drainage.

The Norfolk coarse sand, Sand Hill phase, consists of medium to coarse, loose, incoherent sand, underlain by a pale-yellow, loose, medium to coarse sand. The surface few inches of the type usually contains sufficient organic matter to impart a grayish color, but in many instances this organic matter is so nearly lacking as to make the immediate surface soil nearly white.

The native vegetation of this section consists mainly of scrub oak. Originally the soil supported a valuable growth of long-leaf pine, but most of this has been removed.

RELATIVE IMPORTANCE OF NORTH CAROLINA AS A PEACH GROWING STATE

According to the United States Census reports, there were in North Carolina 2,133,004 peach trees in 1890, 2,773,788 in 1900, and 2,661,791 in 1910, showing an increase of 30 per cent from 1890 to 1900, but a decrease of 4 per cent from 1900 to 1910. Notwithstanding the decrease in total number of trees from 1900 to 1910, there has been a marked increase in commercial plantings during this time. This is explained by the fact that the number of trees in home orchards has been decreasing slightly faster than the increase in commercial orchards, due to the fact that the home orchards have not been given the proper protection from the ravages of the San José Scale and the peach tree borer.

According to the 1910 Census report, North Carolina ranks thirteenth among the States in the number of peach trees and tenth in the production of peaches.

THE OUTLOOK FOR PEACH GROWING

To the growers who will give their trees proper care, peach production in this State offers a lucrative prospect; but if the growers will not give proper attention to spraying and combating diseases and insect pests, to cultivation and to fertilization, they had better forego planting peach orchards.

LOCATION, SITE, AND SOIL

For family use, peaches can be grown with more or less success in all parts of the State. They can be grown under diverse conditions, but for commercial purposes, however, careful attention must be given to the choice of conditions favorable to the crop and its best development. There are various important details to be considered in peach growing, among which the selection of the proper location, site, and soil are factors of the first importance.

Location.—Location is distinguished from site in that the term "location" relates to the general geographical position of the peach section as regards climatic conditions, markets, and transportation fa-

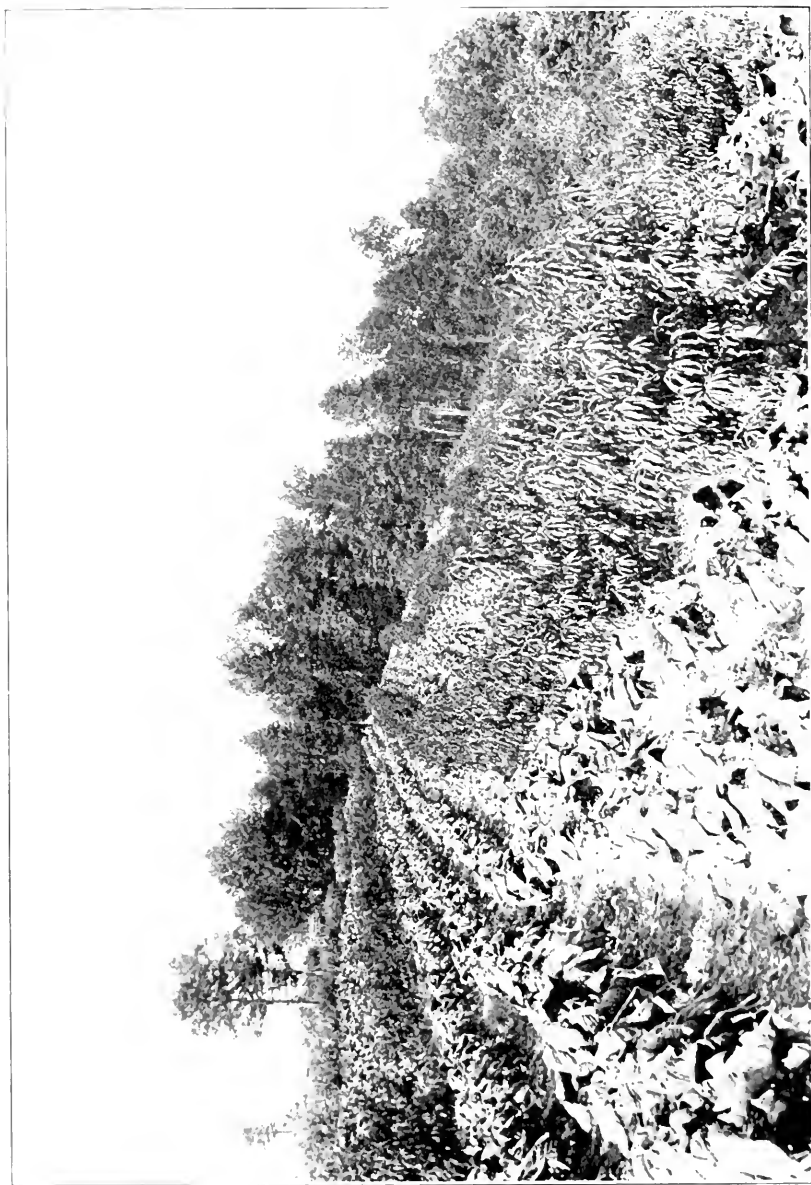


FIG. 5. Commercial orchard in the Mountain Section. Note good atmospheric drainage. The orchard is interplanted with tobacco.

cilities, while the term "site" refers to the local position of a particular planting as regards elevation, exposure, and soil conditions.

For one expecting to engage in commercial peach growing, the choosing of the proper location cannot be too strongly emphasized. To attain the greatest success, the orchard must be located in a region that possesses both favorable climatic and soil conditions for the production of peaches. It is equally important to locate the orchard in a section advantageously situated as regards markets and transportation facilities. The prospective planter should select a section that is relatively free from late spring frost, and one that affords the best markets and the cheapest and most efficient freight rates and refrigerator car service.

Site.—After once deciding upon a particular section, the prospective peach grower is confronted with the choice of the orchard site in the section. The most important factors in determining the value of a site are elevation, exposure, and soil.

An elevation considerably above the surrounding area is to be desired to afford both water and atmospheric drainage, primarily the latter. It is not so much the height of the elevation, but the relative height above the surrounding country which should be sufficient to afford good atmospheric drainage. By atmospheric drainage is meant the draining away of cold, frost-laden air, just as water drains from higher to lower levels. Cold, frost-laden air settles or flows from a higher elevation to a lower. This accounts for the fact that peaches are often produced by trees on hillsides while those in the valleys or at lower levels have their blossoms or fruits destroyed by frost. In a section of hilly or mountainous topography it is often noticed that the vegetation on the lower part of the mountain is killed by frost while above this frost-killed section there is a belt, which is termed a thermal belt, where the vegetation is unharmed. This condition is explained by the phenomenon of atmospheric drainage. While there are some very successful orchards on nearly level land, it is best to choose a slope, everything else being equal, for planting a peach orchard on an elevation is one of the best means of insuring against frost. An elevation insures better air circulation in summer, which means higher colored fruit and less damage by rot. A site which is exposed to strong prevailing winds is not desirable, because the young trees will be badly blown about before they become established in the soil. It is more difficult and more expensive to spray an orchard exposed to stormy winds, and the loss from breakage of limbs and blowing off of fruit is greater.

The slope or exposure of an orchard site is the direction toward which the land slopes or inclines. As regards an exposure, it is not so much the direction of the slope, but that the peach orchard should be planted on a slope of some degree, in some direction rather than on



FIG. 6. Young orchard in the Sand Hills planted on a ridge of a hill. These ridges make the most desirable sites for orchards because of their good atmospheric and water drainage.

the level, principally for the fact that a slope generally affords better soil and atmospheric drainage than level ground. In most instances the importance of exposure has been exaggerated, but it is generally conceded that trees on a very decided southern slope will usually bloom earlier and mature fruit sooner than trees planted on a corresponding northern exposure; but on a slope, the difference in which is not decided, there will be very little difference in the blooming and ripening periods. In sections of this State where peach trees suffer from winter injury, northern exposures are to be preferred. A rather moderate slope should be chosen in preference to a steep one, because soil management will be more economical on the former.

Soil.—The peach will grow on a wide range of soils, and while the tree prefers light, warm, well drained, sandy or loamy land, with a clay subsoil, numerous orchards have been successfully grown upon rather heavy clay and many on deep sands. More important than the soil type is the factor of drainage. The peach will not succeed on soils that are wet, water-logged, and possess an impervious subsoil—proper drainage being absolutely indispensable. In lands that are well drained, the roots go deep, and the trees do not suffer so much from dry summers. Avoid planting the orchard on either muck or heavy clay soils and on all wet, low, and frosty lands.

PREPARATION OF THE LAND

The proper preparation of the land before planting to peaches is highly essential for the best results. The soil should be thoroughly prepared before planting begins. If the orchard is to be planted on freshly cleared land, a cultivated crop, such as corn or cotton, should be grown on the land for a year at least; two seasons in a cultivated crop are better than one. Any crop that is suited to the conditions of the location and that requires frequent cultivation should be used. This causes the land to be cleared of roots or stumps, and puts it in the best condition. If the soil is lacking in fertility and humus, whether it be freshly cleared or old land, a soil-improving legume, such as cowpeas or soybeans, should be grown and turned under in the fall before the trees are planted. Cowpeas may be either broadcasted or drilled in during May, June, or July, depending upon the locality, using 1 to 1½ bushels of seed per acre. If the land has never produced cowpeas, the seed should be inoculated with the nitrogen-fixing bacteria, as this insures a more uniform stand and will materially increase the growth, thus producing a larger quantity of organic matter to be turned under. On poor land it will be of an advantage to use from 150 to 250 pounds of good fertilizer with the peas. This will insure a large amount of humus to be turned under. The green manure crop should be turned under in the fall with a two-horse plow, and the land put in good condition by harrowing.

At the end of a year's growth there is marked difference in size and vigor between trees planted on freshly cleared land and trees planted on land that has been in a cultivated crop before the peaches were planted. The difference is in favor of the trees on the land that was first planted to a cultivated crop.

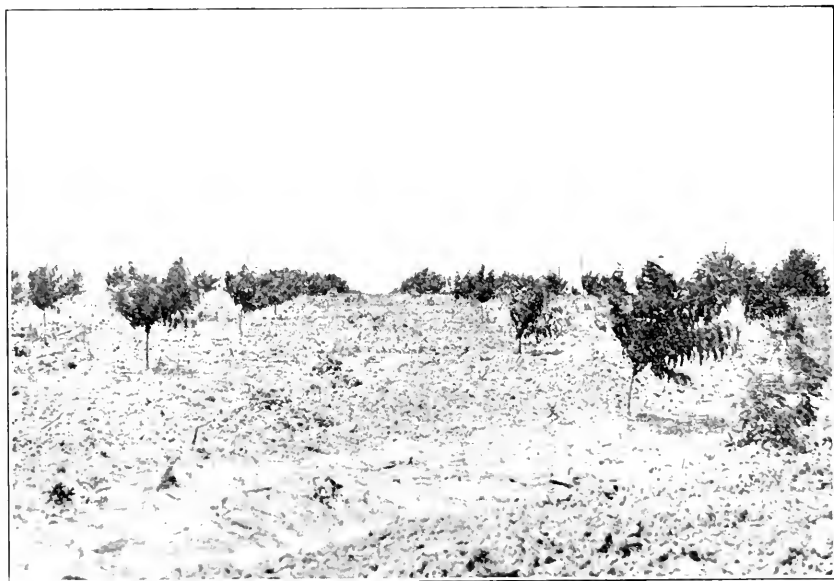


FIG. 7. One-year-old orchard planted on freshly cleared land that has not been in a cultivated crop. Compare with Fig. 8. Note the rolling character of the site.

On all soils deep plowing is essential before planting. Deep plowing increases the moisture-holding capacity of the soil and causes the tree roots to go deeper, which is a decided advantage during summers of drouth. After plowing, the soil should be well pulverized by disking or harrowing or both. A site in good surface condition can be more easily and neatly planted than one which is rough and full of roots. The trees should not be planted when the soil is either too dry or too wet.

PLANTING ON OLD PEACH LAND

The question as to the advisability of planting a peach orchard on land where peaches had formerly been grown often arises. In most sections of this State it is not advisable unless a number of years have elapsed since the land was in peaches. Before planting on such land, a coat of manure or a green manure crop should be turned under. In a few isolated cases, peach orchards have been grown on old peach land; but this is the exception rather than the rule.

LAYING OUT THE ORCHARD

A great deal of care should be exercised in laying off the orchard to have the rows straight in all directions. This point is often neglected, since many orchards are laid off with a plow, and the rows are not perfectly straight. The satisfaction of having straight rows is worth many times the small additional cost of making them so. A convenient method of laying off the orchard to secure straight rows may be described as follows:



FIG. 8. Part of the same orchard as Fig. 7, but the land had been in a cultivated crop for a year before planting to peaches. Note the larger size of trees and the better condition of soil.

Run off the first row or base line along one side of the site, setting a stake where each tree is to stand in the row. Line these stakes up with a transit if one is available; if not, straighten them up with the eye. At one end of the site a second base line is run in the same manner, at right angles to the first line. The position of the remainder of the stakes is determined by two measuring boards, whose length is the distance apart that the trees are to be planted. Starting at the point where the two base lines meet and using the measuring boards as shown in diagrammatic illustration (Fig. 9), the rows may be staked out very accurately. The measuring boards are notched at each end and a stake is driven through the notch where the boards intersect. The measuring boards can be more easily handled if they are fastened together at the end with a bolt.

The site may be staked off by running two base lines, one across each end of the site, and then locating the stakes in the rows at the proper

distance by means of either a steel tape or a wire with rings soldered on it at the correct distance. Any irregularities in the rows may then be lined up correctly with the eye.

A cheap and handy line-method consists of running two base lines, one across each end of the site, setting a stake where each row begins and ends. Then a wire, which has rings or other markers soldered on it at intervals of 20 feet, or whatever distance apart the trees are to be planted, is run between two of the stakes that mark the beginning and end of a row. The wire should be tightly stretched between two heavy

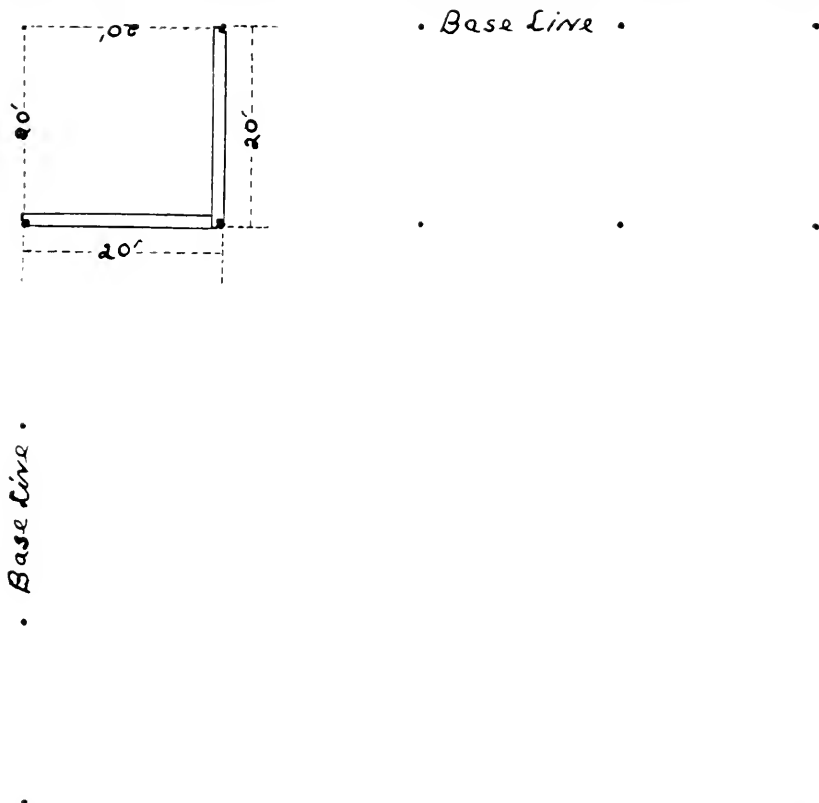


FIG. 9. Diagrammatic illustration of laying out the orchard by means of measuring boards.

stakes that have been driven firmly into the ground where the original stakes stood. While the wire is in place, dig the holes at the markers and plant the trees. If before all the soil is placed in the holes a number of the trees are set, any irregularities in the row may be corrected by having one man straighten the trees while the other sights down the row. When the first row has been set, move the wire to the second, and proceed to dig and plant as in the first row. Continue in this manner until the orchard is planted.

The method of checking off the land the proper distance with a two-horse turn plow, and digging the holes at the intersections, is very commonly employed. Across the ends and sides of the site base lines are run with stakes at intervals equal to the distance between the trees. Furrows are plowed from stakes on one end to corresponding stakes on the other end. Then furrows are plowed across the field between corresponding stakes on the sides. The intersections of the furrows locate the position of the trees. This saves time by helping to dig the holes. If the field is a large one, stakes should be set in line between the end stakes to assist the plowman in keeping the rows straight. This method requires less time, but is impossible to get the trees as straight as by the preceding methods.

Most of the plantings of peach orchards in this State are made on the square method and at distances of from 16 to 20 feet. When planted 16 feet apart, it will require 170 trees per acre; at 18 feet apart, 135 trees per acre; and at 20 feet, 108 trees per acre. On good soil and where the trees are long-lived they should be set at a distance of 20 feet apart. On poor soil a number of growers plant at 18 feet apart. It is rarely advisable to plant closer than 18 feet.

TIME OF PLANTING

Downing, in his well known book, "Fruits and Fruit Trees of America," says: "Early autumn planting is greatly preferred in all mild climates and dry soils."

In this State peach trees should be planted in the fall. Trees can be planted any time from November until early spring, but the fall has many advantages, the most important of which are:

1. Generally, it is the most convenient time, there being less general farm work to be done than in the spring.

2. The tree heals the cut roots, becomes established, and is ready to start growth in the spring, thus acquiring strength to withstand summer drouths.

3. The fall-planted trees generally have made more growth by the end of the first season.

4. The buyer gets the pick of the nursery trees, and is better pleased.

5. Generally the soil can be gotten in better condition.

It is considered that the best results are secured from fall planting, when it is done early. The trees can be transplanted when they have become dormant and shed their leaves. In favorable seasons trees that have been planted in November often become rooted and the wounds healed before cold weather because of the heat stored in the soil during the summer. If the land is too wet, fall planting is not desirable. Trees set out in the spring should be planted in early spring. If the trees are to be planted in the spring, they should be purchased in the fall and "heeled in" until ready to plant.

SELECTION OF TREES

Too much care cannot be given the selection of the trees, as this is as important as the selection of the site or location. An orchard planted with weak and diseased trees is doomed to be an unprofitable one. The most important factor in the selection of trees is to secure healthy, strong, vigorous stock, free from diseases and insects, and true to name. The most desirable are well grown, medium-sized, stocky, one-year-old trees.

The trees should be bought from a section where yellows or other diseases are not prevalent. Nurserymen in this State generally sell their stock in three grades, large size, 4 to 6 feet high: medium size, 3 to 4 feet high, and small size, 2 to 3 feet high.

The ideal type of peach tree for planting is a one-year-old tree which will caliper $1\frac{1}{2}$ to $5\frac{1}{4}$ inches in diameter and is $3\frac{1}{2}$ to 5 feet high. One-year-old trees almost always give better results than either older trees or June buds.

Trees should be ordered in late summer or early fall. Always order a few more than are actually needed, then the injured and poorest can be discarded. The nurseryman should be cautioned not to dig the stock too early and not to strip the leaves before the wood is ripened, as this practice weakens the trees. It is generally much cheaper and more satisfactory to purchase directly from the nursery than through agents. It pays to deal only with nurserymen who by honest dealings have gained a well merited reputation for reliability. In buying trees near home there is a saving in freight costs and a lessening of the danger of injury in transit. These are the most important advantages of purchasing near home.

In answer to the question of whether it is best to secure trees from the north or from the south, it may be said that it makes very little difference where the trees are grown, if they are vigorous, well grown, and free from diseases and insects.

TREATMENT OF TREES BEFORE PLANTING

If possible, the trees should be planted as soon as they arrive. Care should be exercised not to expose the roots to sun, air, wind, or frost, for they will become dried out. On receiving a shipment, it should be unpacked to note the condition of the trees. If they have become dry, the roots should be placed in water until the bark regains its full, bright appearance.

After arrival, if planting is to be deferred, the trees should be heeled in. This is accomplished in the following manner: A trench, 20 inches to 2 feet deep, is dug, throwing the dirt forward so as to make a sloping bank on which lay the trees slanting, with roots in the trench. The trees should be taken from the bundles and laid in thin layers. After

working the soil in well around the roots and tops, packing the dirt firmly, a second trench is dug further back and handled in the same way. As many trenches as are necessary to accommodate all the trees are made in the same way. A layer of soil should be thrown on the whole length of the trees. The sides of the mound should be smoothed so that the water will run off. Small trenches should be dug around



FIG. 10. Root system of a one-year-old peach tree as it comes from the nursery

the base of the mound to carry off surface drainage. Where there is no danger of freezing, drying out, or rabbit injury, only the roots need be covered.

Before planting, or when pruning the roots, the trees should be carefully examined for peach borers, scale insects, black peach aphid, and root gall. If the injury from the borer is only slight, dig out the borer and use the tree; but if it is badly injured, do not use it. Reject trees infested with San José Scale or that are infected with the root gall

disease. Trees that have their roots infested with black peach aphid or plant lice should be dipped in a solution of whale-oil soap, prepared by mixing 1 pound of whale-oil soap with $3\frac{1}{2}$ gallons of water.

Just before planting, cut away to a smooth surface all torn, bruised, lacerated, broken roots and rootlets with a sharp knife. The cuts should be made from the top side of the root downwards and slanting outwards. This causes the exposed cut surface to face upwards and causes the soil to rest upon it when it settles. Wounds made in this



FIG. 11. Root system of one-year-old peach pruned for planting.

way heal more rapidly than cuts made in the opposite manner. Even the small fibrous roots should be cut to short stubs, all dead portions being removed. If properly pruned in this manner, there will be very little loss from root rot even in sections where this trouble occurs. Trees that have been grown in deep soils frequently have long tap-roots. They may be shortened to from 6 to 8 inches for convenience in planting, without injuring the tree.

HOW TO PLANT

The hole in which the tree is to be set should be dug of sufficient size that the roots may rest naturally without crowding or bending. The tree should be set at the same depth, or only slightly deeper than it stood in the nursery row. In regions where winter injury is prevalent, growers sometimes plant their trees leaning slightly in the direction of the prevailing wind, or to the southwest, so that the shade will protect the trunks from the sun. As an additional protection against winter injury and wind, the heavy side of the tree should be planted towards the 2 o'clock sun.

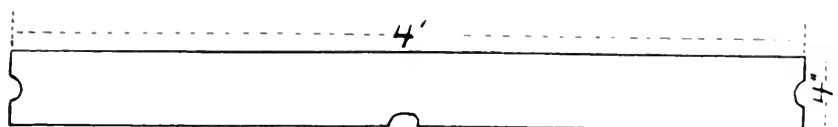


FIG. 12. Diagram of planting board.

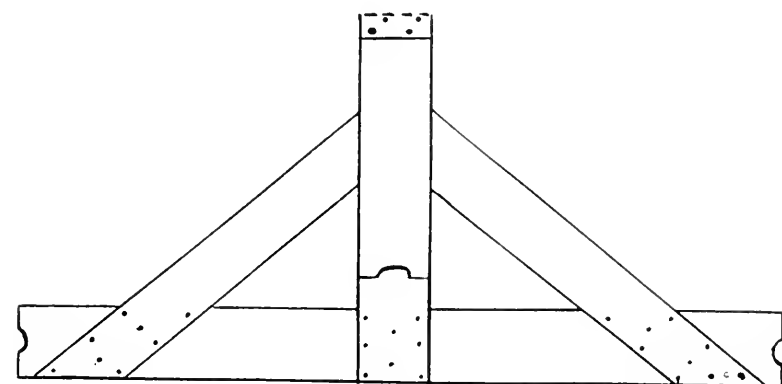
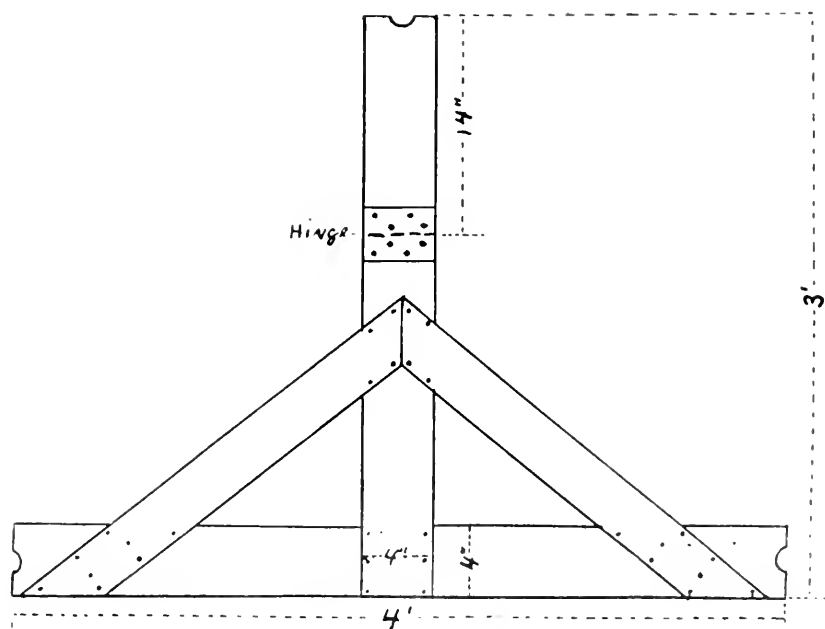


FIG. 13. Diagram of "hinged" planting board.

Every tree has a heavy and a light side. The annual layer is thicker on one side of the tree than on the opposite side, so that the pith of the tree is not at the exact center of the trunk, but more to one side. The heavy side is determined in the following manner: When the tree is taken up to be planted, if it is grasped near the middle, it may be balanced across the hand. As it takes the position of balance, the heavy side will be facing downwards or be next to the hand.

In digging the hole, the topsoil should be put to one side and later placed in the hole around the roots, moving the tree back and forth slightly so as to settle the soil. Every once in a while the soil should be pressed firmly about the roots so as to leave no air-pockets. If the soil is in the proper condition and contains sufficient moisture, no water need be used in planting; but if the soil has dried out, when the hole is three-fourths full of dirt, water may then be added and the hole filled in with loose soil, forming a mulch about the base of the tree.

PLANTING WITH THE PLANTING BOARD

To locate the tree properly, a planting board should be used. These boards are of different kinds and sizes, but one made from 1 x 4-inch planking 4 feet long answers the purpose very well. Notches are cut in each end and in the middle, as shown in Fig. 12. The middle notch is placed against the stake, two small stakes are driven down in each of the end notches, the planting board taken away, and the hole dug where the center stake stood. When ready to plant, the board is replaced in its former position, the tree slipped into the notch, and planted where the original stake stood.

A planting board that is even more convenient, known as the "hinged" planting board, may be employed. It is used in practically the same manner as the ordinary planting board, with one exception. It is not removed when the hole for the tree is dug, but the hinged portion is thrown back and the hole dug. Then the hinged portion is returned to its original position and the tree located correctly. By referring to Fig. 13 its plan of use and construction may be learned.

The method of staking off an orchard and then planting by means of the planting board is considered to be too expensive by some, but for those who care for straight rows and a symmetrical looking orchard, the small additional expense should not be considered.

PRUNING AFTER PLANTING

Pruning after planting determines the height of the head, lays the foundation for the shape of the tree, and introduces the system of pruning. The top of the young tree should not be pruned before it is planted. It is necessary to prune young trees when transplanting to restore the balance between roots and top. Many of the roots were cut

when the tree was dug, and to balance this pruning a portion of the top should be removed. By removing a portion of the top, the danger of the young tree being injured, by drying out, is lessened.

Orchardists in this State head their trees at from 12 to 26 inches, but the most popular and, also, the most satisfactory height is from

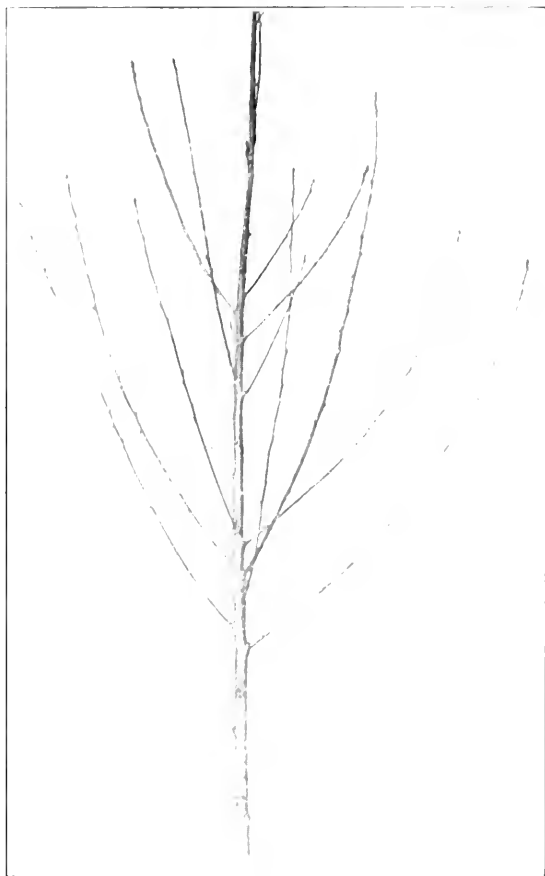


FIG. 14. Head of a 4 to 5 foot, one-year-old peach tree as it comes from the nursery.

16 to 20 inches. After heading at the proper height, if the tree is a large one-year-old, from three to five branches that are well distributed around the main stem should be chosen and all other growth removed.

At this point there are two methods followed by growers. Some growers cut back these branches to stubs with one or two strong buds, while others leave these branches from 12 to 16 inches long and develop

them as the primary limbs. If the tree is a small one-year-old, or is only a whip, head in at the desired height, and leave strong buds below the cut. It is desirable to have the framework limbs spring from the main stem in the form of an inverted tripod. These limbs should be

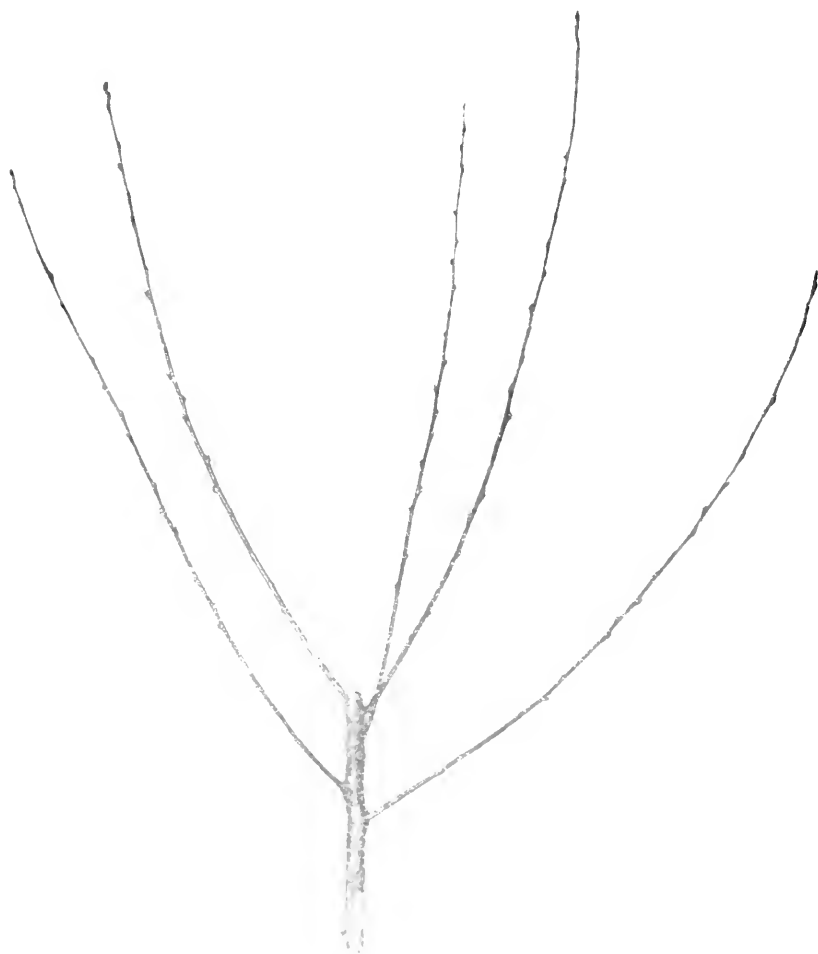


FIG. 15. First step in pruning the young tree. Heading at the proper height and removing branches other than those desired for main branches.

spaced at from 3 to 5 inches apart so as to prevent the formation of undesirable crotches. The peach is a vigorous grower, and should be pruned severely. The open-head system is the most satisfactory one for this fruit.

CULTIVATION OR TILLAGE

Cultivation or, more properly, tillage refers to the operation of working the soil with such implements as the plow, cultivator, or harrow, with the idea of forming and preserving a surface mulch and to control the weeds. To get the best results, clean culture must be the



FIG. 16. Cutting back main branches to one or more strong buds.

rule in both young and old orchards. No fruit tree is more responsive to good tillage than the peach. It requires a lighter, looser condition of the surface soil, better soil aeration, and consequently more thorough tillage than other tree fruits.



FIG. 17. Viewing the young tree from above. Note the distribution of the stubbed branches.

A comprehensive summary of the principal objects of tillage has been made as follows:*

1. Tillage improves the physical condition or structure of the land:
 - a. By fining the soil, and thereby presenting greater feeding surface to the roots.
 - b. By increasing the depth of the soil, and thereby giving a greater foraging and roothold area to the plant.
 - c. By supplying air to the roots.
2. Tillage may save moisture:
 - d. By increasing the water-holding capacity of the soil.
 - e. By checking evaporation.

*Bailey, L. H., Principles of Fruit Growing, p. 76. Revised Edition, 1915.

3. Tillage may augment chemical activities.
 - f.* By aiding in setting free plant food.
 - g.* By promoting nitrification.
 - h.* By hastening the decomposition of organic matter.
4. Tillage indirectly protects the fruit plantation:
 - i.* By destroying weeds.
 - j.* By destroying insects and breaking up their breeding places.

Generally, the peach orchard should be given clean culture all the early part of the growing season throughout its lifetime, beginning in the spring of the first year after the trees are set.

In normal seasons the orchard should be plowed in the spring just as soon as the ground is in suitable condition to work properly. The date of starting the tillage will be influenced, no doubt, by the character and condition of the cover crop. The handling of the cover crops will be discussed at another place.

Some growers during the first two seasons confine the tillage to strips along each side of the rows of trees, enlarging the strips so that by the third season the entire surface will be tilled.

The ground should first be plowed with a turn plow, throwing the soil towards the trees one year, and away the next. The plowing should be done shallow, not over 3 or 4 inches. By plowing relatively deep, say 5 to 6 inches, when the trees are very young, deeper plowing can be done when the trees are older without so much danger to the roots. Extreme care should be exercised so as not to injure the roots or the trees with tillage implements. The plow may be used closer to young than to old trees, as their roots are slightly deeper in the ground. In any case the space next to the trees should be plowed with an orchard harrow to prevent injury to the roots.

Various modifications of the harness are in use to prevent injury to the trees. Several forms of traceless harness have been designed to enable a span of horses to be driven quite close to the trees without injury.

The character of the soil will in a large measure determine the tillage implement. If the soil is light, sandy, and not much compacted, it may not be necessary to plow; but some type of cultivator or disk will serve to pulverize the surface soil to such a depth as to form a mulch 3 to 4 inches deep. After plowing, if the surface is rough, it will be found advisable to follow with a disk and then to harrow to make a mulch and to level the surface.

In the western part of the State where many peach orchard soils are sometimes so rocky that the disk harrow cannot be used, the spring-tooth harrow gives the best results. Where trees are large, a tillage implement of the extension type is more useful for stirring the soil near the trees.

After the initial plowing in the spring, subsequent cultivations are mainly to preserve a dust mulch 3 to 4 inches deep to prevent excessive

evaporation of moisture, and to control weeds. The orchard should be tilled as soon as possible after each rain, for if a crust forms, or if the surface becomes compacted, serious loss of moisture from the soil will result—moisture that may be badly needed to make the crop.

The soil should be stirred as often as necessary to preserve the mulch. In the Sand Hill Section, where the soil is easily handled, subsequent cultivations after the initial plowing may be made satisfactorily with either a Planet Junior cultivator or spike-tooth harrow or a smoothing harrow. In the western part of the State it may be found advisable to use a disk harrow to loosen the soil after a packing rain. Tillage



FIG. 18. Young orchard with cowpeas grown between the rows as a cover crop.

should be discontinued after the last of July or the first of August. By this time wood growth has been largely made, and the fruit buds have started to form. Old trees may be tilled slightly longer than young, vigorous trees.

In old, closely planted orchards it may be found necessary to discontinue tillage rather early during seasons of heavy crop if the limbs bend to the ground under the load of fruit and interfere with cultivation.

COVER CROPS

The surface of the orchard should be protected with some kind of a cover crop during fall and winter. A cover crop is one that is grown for the benefit of the orchard soil and is plowed under either in the fall or early spring.

The most important objects of a cover crop are:

1. To add nitrogen and plant food.
2. To add humus, which makes the soil more retentive of moisture.
3. To prevent washing and leaching, and thus preserve the fertility of the soil.
4. To check fall growth by using available moisture.
5. To improve the physical condition of the soil.

There are two types of cover crops: the legumes, such as cowpeas, soybeans, crimson clover, vetch, and bur clover; and the non-legumes, the chief of which is rye. Legumes are plants that take nitrogen from the air and add it to the soil, while non-legumes are plants that use the available nitrogen in the soil and serve to hold it over until the next season. The legumes should be inoculated with nitrogen-fixing bacteria, if the ground has not within recent years grown the particular legume that the orchardist desires to use. Inoculation of the seed insures a larger and more uniform stand.



FIG. 19. Young orchard in Sand Hills with cowpeas drilled between rows as a cover crop.

Cowpeas and soybeans are in most general use in this State as soil improvers and cover crops. In young orchards, cowpeas or soybeans are put in drills in June and tillage of both peas and trees continued with a small cultivator until about the first of August or until growth of the peas prevents further tillage. When peas are drilled in young orchards, a clean strip 4 to 6 feet wide is left on each side of the tree rows. In bearing orchards, cowpeas or soybeans are either drilled or broadcasted in July, generally after the middle of the month. The cowpeas are seeded at the rate of from 1 to 2 bushels, and soybeans at the rate of from $1\frac{1}{2}$ to 1 bushel, depending on whether they are drilled in or broadcasted. The first severe frost kills the cowpeas, and because of this, some growers plow them under in the fall and immediately sow rye to cover the ground during the winter. Other orchard-

ists allow the dead vines to cover the ground until spring, when they are plowed under. There is some loss of fertility in allowing cowpeas to cover the ground during winter. Cowpeas are in most general use in the Sand Hills, as the other legumes do not grow so well. Cowpeas grown through the summer and plowed under in the fall, followed by rye, furnish the most satisfactory combination for the Sand Hill Section.

In sections where the soil is of a clay nature and there is sufficient moisture in the soil at seeding time to insure germination, there is no better cover crop than crimson clover. For soils of the above character, crimson clover and rye furnish an ideal combination. When used alone, crimson clover should be seeded at the rate of 15 pounds per acre, but when used in combination with rye it should be seeded at the rate of 10 pounds of clover seed and 1 bushel of rye per acre. Crimson clover should be seeded in August, while rye may be sown later. Ground covered with crimson clover should be plowed early in the spring. If a crop of crimson clover grows much in the spring, it dries out the soil to such an extent that sometimes plowing has to be delayed until after a rain.

Where there is a lack of moisture in late summer, and where crimson clover winter kills, hairy or winter vetch may be used in its place. When used alone, vetch should be seeded at the rate of 30 pounds of seed per acre. When used in combination with rye it should be seeded at the rate of 20 pounds of seed and a bushel of rye to the acre.

In the Coastal Plain no better crop can be used than bur clover, but in the other sections of the State peach growers have not been successful in growing it. Bur clover should be sown in August at the rate of 5 bushels of seed in the bur or about 20 pounds of clean seed per acre. A bushel of seed in the burs weighs 10 pounds. It is advisable to soak bur clover seed for fifteen or twenty minutes in warm water before planting. After sowing, it is best to work the seed into the soil with a spring or spike-tooth cultivator. Where it is possible to grow the crop, a combination of bur clover and rye, seeded at the rate of 4 bushels of bur clover in the bur and a bushel of rye gives excellent results.

Rye is used quite extensively as a fall and winter cover crop. When used alone, it is seeded at the rate of from $1\frac{1}{2}$ to 2 bushels per acre.

Thoroughness of the tillage during spring and early summer has an important bearing on the success of the cover crop in that it preserves moisture to germinate the seed. A cover crop should not be planted before the middle of July, as the stopping of tillage allows the soil to dry out. The cover crop should be plowed under early in the spring so as to conserve moisture. Where a large amount of green organic matter is turned under rather late in spring, it does not decay until too late to be of the most value that season. Also, capillary

attraction between the top and subsoil is broken. If there is a large amount of material to be turned under, it should be thoroughly disked before plowing.

If the season is very dry, and there is a large crop on the trees, it may be advisable to omit the cover crop for a season, so that the trees may have all the available moisture.

INTERPLANTED CROPS

Where the land is fertile, intercropping the young orchard is permissible for the first year or two; but it is not advisable where the soil is light and lacking in fertility. The practice of intercropping is of no advantage to a properly managed peach orchard, but no serious injury will result to the trees if a suitable crop is selected and the interests of the trees always observed. Generally, it will prove more profitable in the end to use a system of clean tillage and cover crops.



FIG. 20. Young orchard interplanted with corn. This practice is not advisable, as the corn shades the trees too much.

The interplanted crop should be one which requires the same tillage as the peach, and one that should be tilled about the same length of time.

The grower should understand that in using an intercrop, a system of double cropping the land is being employed, and that more fertility should be supplied to the trees. By no means should there be an interplanted crop after the second or third year. The interplanted crop should not be closer than 5 or 6 feet to the trees.

Corn, which is sometimes grown as an intercrop during the first and second years, is very objectionable on light lands, since it makes

a very heavy draft on the fertility and moisture of the soil. When corn is used, it is generally planted so close to the trees that it makes an undesirable shade during the latter part of the summer.

Cotton is less objectionable than corn and is used more in the South. This crop does not shade the trees as much as corn and does not exhaust the surface soil to such an extent.

FERTILIZERS

Where the soil is not fertile, and cover crops do not supply sufficient fertility, it is necessary to use chemical fertilizers to secure the best results. If stable manure is at hand, it may be applied, since it furnishes both plant food and humus. Generally, the supply of stable manure is limited, and only small amounts are available, so dependence must be placed for the source of humus and plant food on cover crops and commercial fertilizers.

There is a wide difference of opinion among growers with regard to fertilizing the peach orchard, and it is a matter on which very little definite instruction can be given. However, the most accurate results of fertilizer experiments clearly indicate that the peach feeds most heavily on nitrogen, uses a slightly less amount of potash, and uses a relatively small amount of phosphorus. These experiments show that in most cases nitrogen increases the yield, and disproves the theory of some orchardists that this element is injurious to the peach.

As a general rule, soils that are adapted to peach growing in this State are more or less deficient in fertility, and it is an exception when maximum crops are secured without supplying plant food artificially. Commercial fertilizers without humus have no place in peach orchard management. The poorest results are derived from fertilizers applied to soils lacking in humus. Nitrate of soda and to a less extent sulphate of ammonia are the only fertilizers that can be readily absorbed without humus. Others require, to a large degree, the action of humus to bring about the chemical changes necessary before the fertilizer can be absorbed by the roots, and for this reason commercial fertilizers should be used in conjunction with a cover crop.

The success of a fertilizer depends to such an extent on local factors and conditions that it is difficult to recommend a formula for general use. In general, it may be said that the majority of the peach orchards in the State are greatly in need of humus and nitrogen. As a rule the lighter, sandy soils need more potash than do the clays. General indications of the deficiency of plant food are the lack of vigor and premature ripening of the trees, the presence of yellow leaves, and the faded appearance of the foliage. The bearing of a heavy crop of fruit and the subsequent weakening of the tree are frequently the first signs of the lack of sufficient fertility.

In handling peach orchard soils with the idea of economically maintaining them in a highly productive state, it is of the greatest importance to determine what element or elements are limiting the productivity of the orchard. If large quantities of a complete fertilizer are applied, it is generally the case that some element is being supplied in excessive amounts while the limiting element is being supplied in a smaller quantity than is necessary.

Every grower should determine just what his soil needs are by applying each kind of food alone to a certain portion of the ground and ascertaining which food or foods give the best results. The orchardist will then have some idea what the soil lacks, and he may experiment further and determine what combination of plant foods give the best results.

When nitrogen is deficient, the trees are stunted in growth, the leaves are small and have a pale color. Trees that are supplied with sufficient nitrogen are vigorous, the leaves large and dark green in color. It is generally considered among growers that the use of potash gives the fruit more color, improves its carrying qualities, and induces the production of strong, well matured wood.

When fertilizers were to be secured at normal prices, the following combinations have given satisfaction in commercial bearing orchards in the State:

1. Use per acre:

- 150 pounds of sulphate or muriate of potash.
- 100 pounds of ground bone.
- 200 pounds of acid phosphate.
- 150 pounds of nitrate of soda.

2. Use per acre:

- 100 pounds of sulphate or muriate of potash.
- 200 pounds of acid phosphate.
- 300 pounds of cotton seed meal.

3. Use 500 pounds per acre of:

- 5 per cent nitrogen in beef scraps and tankage.
- 8 per cent phosphorus in acid phosphate.
- 10 per cent potash in sulphate or muriate of potash.

Growers sometimes make a second application, consisting of nitrate of soda, in May or June, if the trees are not making a sufficiently vigorous growth and the leaves are pale.

Where potash is not available, a mixture of

- 200 pounds of acid phosphate.
- 300 pounds of cotton seed meal.
- 100 pounds of nitrate of soda.

per acre should give as good results as any mixture it will be possible to obtain.

Fertilizers should be applied either in early spring or at the first cultivation. By using a broadcast fertilizer distributor or a grain drill, with the fertilizer side set at the proper proportion, the fertilizer may be applied very efficiently.

On relatively rich land it may not be necessary to fertilize the peach orchard until it comes into bearing; but, on poor sandy soil, it is advisable to fertilize the young trees. In the spring during the first year a half-pound of equal parts of cotton-seed meal and nitrate of soda should be scattered around the tree, but not against the main stem. The fertilizer should be distributed over an area of 4 feet. During the second year $1\frac{1}{2}$ to 1 pound of the same mixture may be used, distributed around the tree and over an area of about 6 feet. During the third year a pound or a little over may be used. The fourth year the trees may be fertilized as for a bearing orchard.

THE USE OF STABLE MANURE

In the different peach sections of the country there is a wide difference of opinion in regard to the use of stable manure on the peach orchard, but on the light, sandy lands of this State it is of immense value in improving the soil by adding humus and fertility. When available for use, it should be applied during the winter or early in the spring.

On poor soils when the trees are making a weak growth and the foliage has a pale, yellowish tinge, stable manure answers better than any other fertilizer in bringing them into a vigorous condition. On soils of moderate to rather high fertility, if too much manure is used it may overstimulate the vegetative activities of the tree to the detriment of its fruit producing tendencies. Excessive amounts of stable manure produce the same effect as other nitrogenous fertilizers in causing the peaches to mature later and to be lacking in color. Trees that are in a weakened condition from the ravages of root troubles, such as root aphis, root rot, crown gall, or sour soil, may be brought into a more vigorous condition by the use of stable manure. Trees that are in such a weakened state can stand much more fertilizer than healthy trees.

PRUNING

The most successful orchardists prune their trees regularly and systematically. To secure the best results from pruning, and to do it intelligently, the orchardist should clearly understand the objects that may be accomplished by pruning. The chief objects of pruning are:

1. To modify the vigor of the tree.
2. To form a framework, to cause the tree to grow shapely, and to keep the tree within reasonable bounds.

3. To keep the top and center of the tree open so as to admit sun and air.
4. To stimulate the production of fruit buds and their proper distribution.
5. To facilitate and make more economical the harvesting of fruit.
6. To cause the trees to grow stocky.

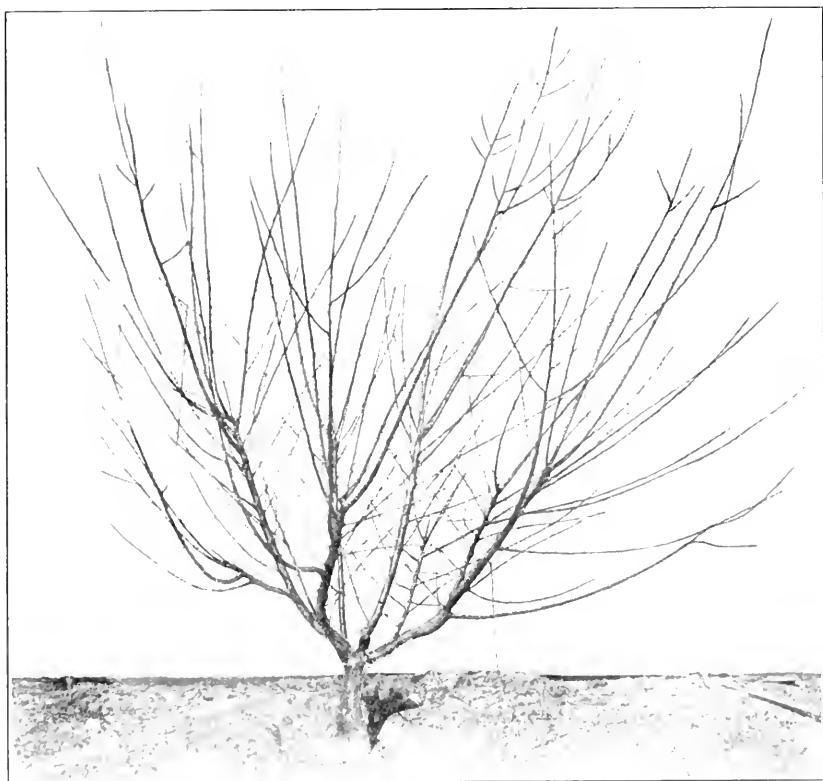


FIG. 21. Three-year old peach tree before being pruned.

7. To remove unnecessary and dead branches.
 8. To thin the fruit buds.
 9. To permit of more thorough and more economical spraying.
- Some general principles to bear in mind in pruning the peach are:
1. The fruit is always borne on wood that grew the previous season.
 2. Heavy winter pruning tends to produce vigorous wood growth.
 3. Branches generally grow from uppermost buds.
 4. Cutting off of terminals tends to develop lateral growth.

5. The branches and twigs of trees are in constant competition with each other; when the number of branches is reduced those that remain become more vigorous.

The objects of pruning above enumerated can be best accomplished by means of the open head or "vase-form" system of pruning, and no other system should be used with the peach.

The form and shape of the tree is dependent upon the pruning of the first two or three years. It is during this period that the foundation or the framework of the tree is established.

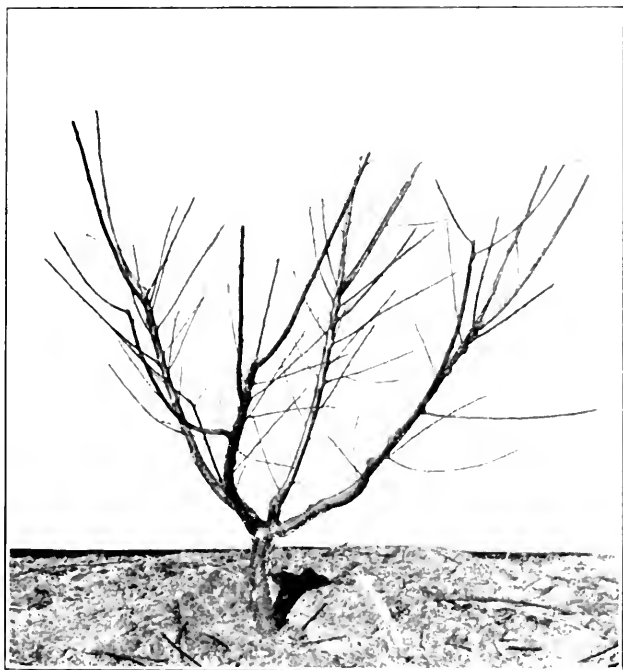


FIG. 22. Same tree as in Fig. 21 after being pruned.

PRUNING AT THE END OF THE FIRST YEAR

Heading the young tree has already been discussed. The pruning operation at the end of the first year consists in the development of the primary scaffold limbs. When the tree was headed back at planting time, three to five stubs were left on the main stem. From each of these stubs two or more main branches, depending upon the number of buds left on the stubs, have grown. After selecting two of these main branches that are symmetrically and properly placed, head them back to lengths of from 12 to 16 inches, and remove everything else.

PRUNING AT THE END OF THE SECOND YEAR

It is the primary object of the pruning operation during the first two years to develop the framework of the tree. At the end of the second season the pruning is much the same as that of the first year. Two strong, outwardly inclined branches near the end of the primary scaffold or main limbs are selected. These branches are pruned back to lengths of from 14 to 20 inches, and all other branches are removed. All the small twigs need not be removed, but the strongest may be cut back and allowed to bear fruit. The trees will produce fruit the third

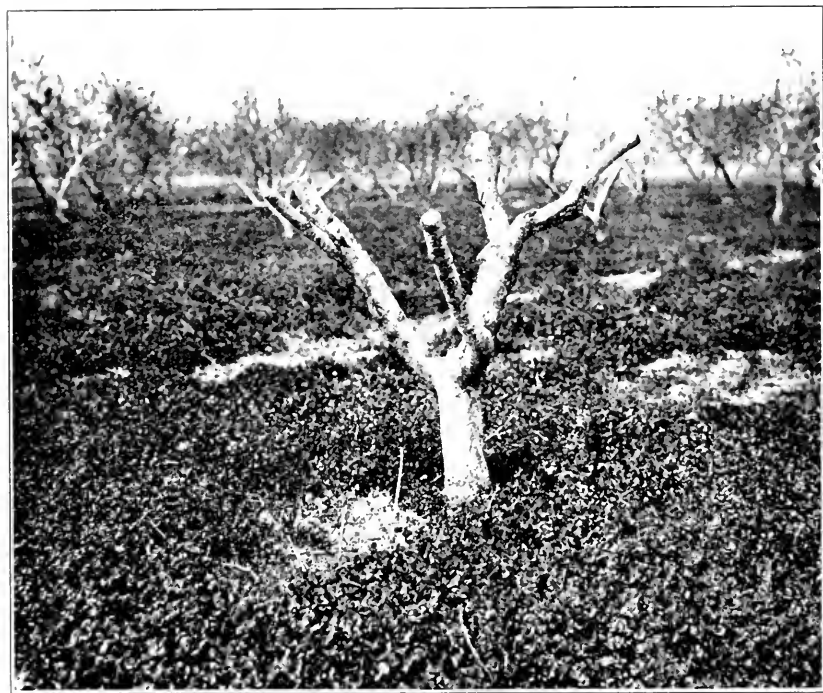


FIG. 23. Correct method of "dehorning" practiced during seasons when the buds are killed. The "dehorned" tree produces a new top the current season, which bears a crop the next year. This figure also shows bur clover as a cover crop in the Coastal Plain Section. Photograph taken in April.

season, but it is best to permit the young trees to bear very little until the fourth season, as the energy of the tree should be directed towards the developing of a large framework the first two seasons and towards producing fruiting wood the third season.

PRUNING AT THE END OF THE THIRD YEAR

The tree now has the first-year framework limbs, the second-year branches and a great number of new branches and smaller twigs.

Select two of the outwardly growing branches near the end of each of the second year branches and cut them back to about 16 to 20 inches long. All the other large branches that would later compete with these selected for the framework should be removed. The rest of the pruning consists of thinning out the fruiting branches and heading back the more vigorous ones.

PRUNING AFTER THE FOURTH AND SUCCEEDING YEARS

When the tree reaches this age, the fundamental principle of pruning is based on the fact that the fruit is always borne on wood that grew



FIG. 24. Six-year-old peach tree, showing where the blossoms are produced. Poor pruning combined with the natural tendency of the tree cause the majority of the blossoms to be produced at the outside of the tree. Note that the most of the fruit-bearing wood has been removed from the main limbs. Compare with Fig. 25.

the previous season. The management of the trees should result in a vigorous growth each year.

The framework building should be continued as in previous years; all branches competing with the framework branches should be either removed or headed back for temporary fruiting wood. The framework branches should be cut back to lengths of from 16 to 20 inches. The fruiting branches and twigs should be headed back and the crowded or undesirable ones thinned out. As the trees become older, there will be

more crowding and not so much length growth; necessarily more pruning will have to be done and less heading-in of the terminals. The practice of heading-in from year to year and pruning so as to form an open, spreading, low-topped tree, produces strong, stock limbs. The tree is enabled to hold up under heavy crops of fruit and produce the fruit near the ground, where it can be more easily sprayed and harvested. By keeping the head open and spreading, the sun and air are admitted, which produce more highly colored fruit and reduce the amount of brown rot.

The extent of the annual shearing of the trees will depend on the number and condition of the fruit buds. If there are a large number

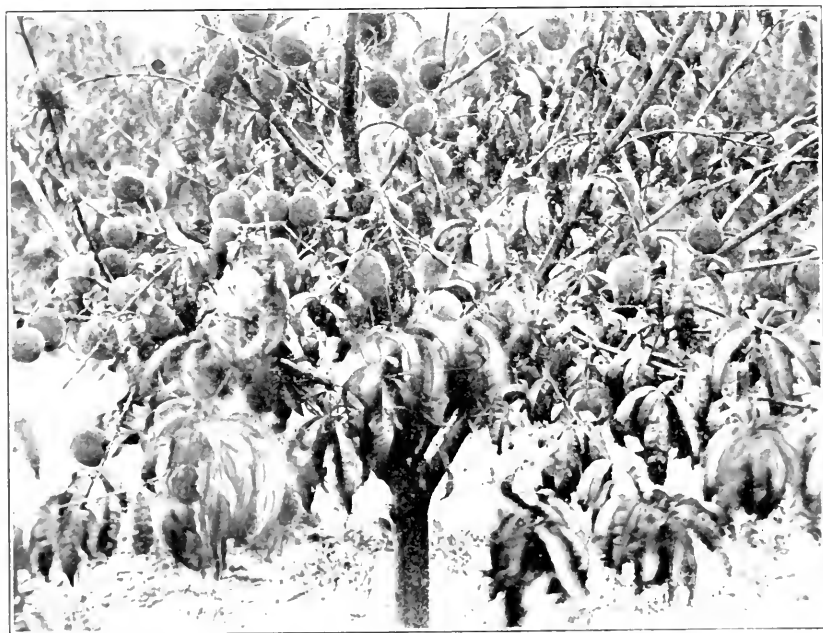


FIG. 25. A tree properly pruned produces fruit down to the crotch.

of vigorous buds, considerable heading-in may be practiced; while if a number of the buds have been killed, it is advisable to head in very little or none at all during that particular season. Should all the buds be killed, it will be advisable to head back severely. In the case of trees eight years of age and older where the fruit buds have been killed, it will generally be found advisable to cut them back severely or dehorn them. See Fig. 23. In "dehorning," the main limbs are generally cut to stubs 3 to 5 feet in length. It is possible to grow a new top during the season following the "dehorning" operation which will produce a crop the following year. The winter pruning may be

reduced somewhat by going over the trees throughout the summer and removing shoots that are out of place or interfering. Those that are making exceptional growth and which may later unbalance the tree may be checked by pinching them back. Pruning may be done at any time during the dormant season, but in this State late winter or early spring before growth starts is the most advisable time. At this time the indications for a crop are better known and the trees can be pruned accordingly.

THINNING

There is no factor which contributes more to bringing out the excellent qualities of peaches and towards giving them good size and handsome appearance than thinning the young fruit. It has been demonstrated, time and time again, in the leading peach sections of the country that in normal seasons no work in connection with peach growing pays more than the operation of thinning; yet this operation is the exception rather than the rule.

Peaches should be thinned immediately after what is known as the "June drop," which occurs, generally, in May in North Carolina. The correct distance to thin is governed chiefly by the number of fruits, the variety, the age of the tree, the vigor of the tree, the fertility of the soil, and the amount of moisture available. Thinning is more valuable during years of normal or heavy crops than during seasons when the crop is small.

Some varieties, like Mayflower, Greensboro, Dewey, and Old Mixon, require more thinning than others. Old trees as a general rule require more thinning than younger trees. The more vigorous the tree the more fertile the soil, and the more moisture available the less the amount of thinning to be done.

The proper distance to thin requires more judgment on the part of the orchardist than almost any other orchard operation. Experiments conducted by this Station show that under normal conditions peaches should be thinned to a minimum distance of from 4 to 6 inches. Taking into consideration the health and longevity of the tree, 6 inches as a minimum distance will be found to give the best results. In thinning, remove all insect-injured, deformed, and undersized fruits. If it becomes noticeable later in the season that not a sufficient amount of fruit was removed, a second thinning may be made.

The chief advantages of thinning are:

1. Thinning enables the tree to produce the largest possible weight of fruit with the least expenditure of energy.
2. It tends to distribute the weight more evenly over the tree, so that the danger of breaking the limbs is reduced to a minimum.
3. It enables the tree to produce vigorous growth and strong fruit buds.

4. It permits of better and more thorough spraying.
5. There are more crates of peaches of a better size and quality.
6. The fruit ripens more evenly.
7. It produces fruit that is more uniform and easier to grade.
8. It prevents the excessive weakening of the tree. The development of the pits is an exhaustive process, but by reducing the number of pits produced, the tree is not so much weakened.

The cost of thinning is one of the main factors that prevents many growers from doing it, but when the advantages of the operation are considered, the cost becomes a matter of small importance. The cost of the operation of thinning is variable, depending upon the amount of fruit, the size of the trees, the quality of the labor, and the season.

SPRAYING AND ORCHARD PROTECTION

To grow peaches successfully, they must be given the proper protection against the different insects and diseases that attack the tree and its fruit. For full instructions for spraying and preparing spray mixtures, see North Carolina Department of Agriculture Bulletin, Whole No. 209, on Orchard Spraying and Orchard Protection. For specific information on questions of insect control, inquiries should be directed to Division of Entomology, North Carolina Department of Agriculture, Raleigh, North Carolina, while information on questions of disease control may be obtained from the Office of Plant Pathology, West Raleigh, North Carolina.

*The following system of spraying has been recommended for this State:

Dormant or Winter Spray.—This is for San José Scale, primarily. It is given in late winter or early spring. Use commercial lime-sulphur at the rate of 1 gallon to 8 gallons of water.

Second Spray.—A week after petals fall or when the blossom shuck begins to shed. Use self-boiled lime-sulphur solution made of 8 pounds of sulphur, 8 pounds of stone lime, and 50 gallons of water, to which $2\frac{1}{2}$ pounds of arsenate of lead paste or $1\frac{1}{4}$ pounds of powdered arsenate of lead is added.

Third Spray.—This spray is applied two or three weeks after the second spray. Use same mixture as for the previous spray.

Fourth Spray.—This spraying is made one month before the fruit ripens. Use same mixture as in previous spray, but the arsenate of lead is omitted.

The first three sprays should be applied to all varieties. The fourth spray is omitted with varieties ripening earlier than Belle, but on varieties ripening with Belle and after it should be applied. Among the growers, it is a question whether or not the last spray for Belles,

*Adapted from Bulletin, Whole No. 209, North Carolina Department of Agriculture.

Elberta, and varieties ripening at this time and after should contain arsenate of lead. Whether or not it will have much value in reducing the amount of curculio is a debatable question, but there is not much doubt that it aids in coloring the fruit. It is the opinion of many growers that the cost of adding the arsenate of lead to the last summer spray for mid-season varieties is repaid many times by better protection from the curculio and by more highly colored peaches.

Proper care should be exercised in protecting the trees from the ravages of the peach tree borer and the fruit-bark beetle or shot-hole borer. If these two insects operate in the orchard in any numbers, the trees will be very much injured, and sometimes killed. If the grower is not familiar with the best practices of controlling these insects, he should lose no time in learning the best methods of control and putting them into practice.

VARIETIES, RECOMMENDATIONS, AND DESCRIPTIONS

The selection of the proper varieties plays a very important part in the success of a commercial peach orchard, and to a slightly less extent in the success of a home orchard. In every section a few widely known varieties have established themselves. It is advisable to plant these varieties that have proven their worth rather than newer varieties. A few trees of the newer varieties may be worth trying experimentally, but it is not good practice to plant a large number of them until certain of their value.

In the choice and number of varieties to plant, the prospective grower should be governed by such conditions as the size of the orchard, the demands of his market, the competition from other sections, labor facilities, the efficiency of handling facilities, and the orchard site. Of the commercial varieties grown in this State, Elberta is the most tender in bud, while Mayflower, Greensboro, and Arp are the most hardy, consequently the Elberta trees should be planted on that part of the site most free from frost. For convenience in spraying and picking, the varieties should be planted in their order of ripening.

In the commercial orchards located in the Sand Hill and Coastal Plain sections of the State the following varieties, named in order of ripening, have given the best results: Mayflower, Alexander, Greensboro, Arp, Carman, Hiley, Belle, and Elberta. In these sections it is not advisable to plant any variety ripening later than Elberta.

In the Piedmont and Mountain sections of the State, in addition to the above list, Matthews, Crosby, Salway, and some of the late clings, as Stinson or Albright, may be grown profitably.

In selecting varieties for local market and home use, a much wider range of varieties can be chosen than for commercial purposes.

VARIETY DESCRIPTIONS

The date of ripening of the different varieties depends upon the factors of location and season. The same variety ripens two weeks earlier in the Sand Hills than it does in the western part of the State. Some seasons, the varieties ripen a week earlier than during normal years. The dates of ripening as given in the following descriptions have been obtained from observations on the ripening period of peaches in the different sections of the State.

Mayflower.—This variety is the earliest of all peaches. It is one of the hardiest grown in this State and is one of the last to bloom. On account of its earliness and hardiness, commercial orchardists have found it to be one of the most profitable varieties to grow. *Form*, roundish, slightly oblong and slightly pointed. *Size*, small to medium. *Suture*, a depression extending from beyond the axis at stem end to apex. *Apex*, a point. *Surface*, medium fuzzy. *Color*, greenish cream overlaid with red. *Skin*, medium thickness.

Stone, semi-cling. *Flesh*, greenish white, ripening generally from the outside. *Texture*, melting, juicy, slightly stringy. *Flavor*, mild subacid. *Quality*, good, especially so for such an early peach. *Season*, from May 31st to June 17th, depending upon locality.

Alexander.—*Form*, roundish or nearly globular. *Size*, medium. *Suture*, a slight depression. *Apex*, a point. *Surface*, medium fuzzy. *Color*, greenish white, almost covered with dark deep red. *Skin*, medium thickness.

Stone, semi-cling. *Flesh*, greenish white, ripens unevenly. *Texture*, sometimes unevenly firm and soft, juicy. *Flavor*, mild, pleasant subacid. *Quality*, fair to good, considering its season. *Season*, June 15th to July 1st, depending on locality.

Greensboro.—This variety is the first variety to ripen that possesses much quality. It is extremely hardy, and on account of its late blooming habit is very desirable. The characteristic of ripening at the apex first and becoming soft at the tip while the rest of the peach is firm may be considered the chief criticism of this variety.

Form, roundish to oblong, somewhat flattened. *Size*, medium to sometimes large. *Cavity*, abrupt, deep. *Suture*, shallow, extends to apex. *Apex*, rounded with small point, in suture. *Surface*, medium fuzzy. *Color*, a light green, changing when fully ripe to cream color with a red cheek where exposed. *Skin*, thin, tender, and especially so at the apex.

Stone, semi-cling, but free when fully ripe. *Flesh*, white to cream colored, very juicy. *Texture*, tender, melting. *Flavor*, sweet. *Quality*, very good. *Season* June 21st to July 10th, depending on locality.

Arp. The Arp is the first yellow-fleshed peach produced in commercial orchards of this State. On account of its hardness, late blooming habit, and quality, it is very desirable.

Form, roundish, to slightly oblong, flattened slightly at apex. *Size*, medium. *Suture*, extends to apex, slightly depressed. *Apex*, a point in suture. *Surface*, rather smooth, not very fuzzy. *Skin*, rather thick and tough. *Color*, creamy yellow, splashed and covered with red, becoming solid dark red where exposed to sun.

Stone, semi-cling but free when fully ripe. *Flesh*, light yellow, red at center. *Texture*, firm and juicy. *Flavor*, pleasant, mild subacid. *Quality*, good. *Season*, July 5th to July 25th, depending upon locality.

Carman. *Form*, roundish, broadly oval, somewhat compressed. *Size*, large. *Cavity*, very large, rounded. *Suture*, a line extending to apex, sometimes a little beyond, becoming a slight depression near cavity. *Apex*, a small knob with a fleshy point. *Surface*, fuzz short, persistent. *Color*, cream, blushed and overspread with red. *Skin*, medium thickness.

Stone, free, sometimes slightly clinging. *Flesh*, white to cream, red at center. *Texture*, firm and juicy. *Flavor*, pleasant, mild subacid. *Quality*, good. *Season*, July 5th to July 25th, depending upon locality.

Hiley.—*Form*, rather irregular, conical, rather oblong. *Size*, medium to large. *Suture*, a slight depression at cavity, but a line to apex. *Apex*, prominent, a knob with a point. *Surface*, fuzz medium, persistent. *Color*, creamy white, with a blush on side. *Skin*, rather thin, tenacious.

Stone, free. *Flesh*, white, slightly streaked with red. *Texture*, firm juicy. *Flavor*, pleasant, mild subacid. *Quality*, very good. *Season*, July 14th to July 30th, depending on locality.

Belle.—*Form*, oblong, roundish oval, tapering to a point. *Size*, medium to large. *Suture*, a line to beyond apex, slightly depressed at cavity and apex. *Apex*, a teat with a fuzzy point. *Surface*, rather fuzzy, fuzz persistent. *Color*, cream, blushed and covered with red. *Skin*, rather thin, tenacious.

Stone, free. *Flesh*, white, slightly red at pit. *Texture*, tender, juicy. *Flavor*, subacid. *Quality*, very good. *Season*, July 20th to August 10th, depending upon locality.

Elberta.—The Elberta is the standard, midseason commercial peach of the State. Because of its popularity in the markets and its shipping qualities, it is largely grown. It is the most tender variety grown in a commercial way in the State.

Form, roundish oblong to oval and pointed. *Size*, large. *Suture*, deep depression, sometimes extending beyond apex. *Apex*, prominent.

pointed. *Surface*, medium fuzzy. *Color*, yellow, blushed with red where exposed to sun. *Skin*, moderately thick, rather tough.

Stone, free. *Flesh*, pale yellow. *Texture*, firm, meaty, rather juicy. *Flavor*, subacid. *Quality*, good. *Season*, August 3d to August 15th, depending upon locality.

Matthews.—*Form*, roundish. *Size*, large. *Suture*, extends slightly beyond apex, consists of intermittent depressions. *Apex*, a point. *Surface*, rather fuzzy, fuzz not persistent. *Color*, yellow, covered with deep red. *Skin*, thick, not very tough.

Stone, large. *Flesh*, yellow, red at stone. *Texture*, firm, juicy, melting. *Flavor*, subacid. *Quality*, very good. *Season*, August 12th to August 30th, depending upon locality.

Crosby.—*Form*, globular to rather oblate, sometimes flattened, at base and apex. *Size*, large. *Suture*, extends beyond apex. *Apex*, rounded, with a point. *Surface*, rather fuzzy. *Color*, pale yellow, blushed and mottled with red. *Skin*, medium thickness to thin.

Stone, free. *Flesh*, yellow. *Texture*, meaty, juicy. *Flavor*, mild subacid. *Quality*, very good. *Season*, August 20th to September 5th, depending upon locality.

Salway.—*Form*, nearly round. *Size*, medium. *Suture*, a depression, extending beyond apex, deeper at cavity and apex. *Apex*, black point in suture. *Surface*, fuzzy, fuzz not persistent. *Color*, yellow blushed with red. *Skin*, rather thin and tender.

Stone, free. *Flesh*, yellow, red at stone. *Texture*, meaty, melting. *Flavor*, mild subacid. *Quality*, good. *Season*, September 10th to September 30th, depending upon locality.

Stinson.—*Form*, roundish conic, pointed. *Size*, medium. *Suture*, a slight depression to apex, deeper at cavity and apex. *Apex*, a teat with black point. *Surface*, fuzzy, fuzz not persistent. *Color*, cream, covered with pinkish red which becomes purplish red in sun. *Skin*, brittle.

Stone, cling. *Flesh*, white, red at stone, and red at apex. *Texture*, firm, fine grained, juicy. *Flavor*, mild subacid. *Quality*, good. *Season*, October 1st to 15th, depending upon locality.

Albright.—*Form*, roundish to roundish oblong, somewhat oblique. *Size*, medium to large. *Suture*, a depression from cavity to slightly beyond apex. *Apex*, a black point in suture. *Surface*, very fuzzy, fuzz not persistent. *Color*, creamy white, with slight pink blush in sun. *Skin*, thick and brittle, tough.

Stone, cling. *Flesh*, greenish white. *Texture*, tough, firm, fine grained. *Flavor*, subacid. *Quality*, fair to good. *Season*, October 1st to 15th, depending upon locality.

GENERAL CORRELATIONS AND RECOMMENDATIONS

Climate influences to a large degree the cultural practices employed by orchardists. Climatic conditions often determine the success or failure of the peach crop. In the northern States one of the fundamental principles of successful peach orchard management consists in having growth cease and the wood thoroughly matured and ripened in the fall, so that it will not be injured by critical temperatures in winter. All the cultural practices are regulated with this principle in mind. Tillage is discontinued in midseason, nitrogenous fertilizers are supplied in an amount that will not cause late growth, and cover crops are employed to hasten the ripening of the trees. The weather during winter is uniformly cold, with no warm spells to cause fruit buds to swell until spring, when it becomes warm enough to start the buds, and then there is little danger from low temperature or freezes. Therefore the principal idea of management consists in handling the orchard in such a manner as to have the trees fully mature and dormant by winter.

In the South altogether different climatic conditions afford a different source of danger to the peach crop. Here, instead of continuous low temperature without enough warm days to break the dormancy of the trees, the weather is characterized by periods of bright, warm, sunny days during December, January, and February. During these periods the buds are often started. This makes them tender and susceptible to injury by the lower temperatures that follow. Generally, the temperatures that follow the warm periods are entirely seasonable and would not injure the buds if they were in a dormant condition and had not been started. Under southern conditions the method of handling peach orchards employed in the North does not afford the greatest insurance against injury to the buds; but, nevertheless, most of the growers manage their orchards according to this method.

*Experimental results in handling peach trees under southern conditions show that the trees should be kept in a growing condition until late in the season. The reason for continuing the growth of the trees rather late in the season, as brought out in these experimental results, is based on the fact that the peach has a rest period, or a period during which the trees normally remain dormant. During this period the trees will not respond to conditions favorable to growth. The rest period continues for a fairly definite length of time, and it is not until after the expiration of this period that the trees will respond, to any extent, to the influences of temperature. When once the trees have

*Missouri Agricultural Experiment Station Bulletin 74, entitled "The Winter-Killing of Peach Buds As Influenced by Previous Treatment."

Missouri Agricultural Experiment Station Circular of Information 31, entitled "Hardiness of Peach Buds, Blossoms, and Young Fruit As Influenced by the Care of the Orchard."


Missouri Agricultural Experiment Station Bulletin 111, Report of the Director for the Year Ending June 30, 1912.

become fully dormant they are not influenced appreciably by temperatures that would, after the ending of the rest period, cause the resumption of growth activities, start the buds, and make them tender.

The rest period is not broken suddenly, but gradually. After the rest period proper has ended and growth activities within the trees increase, buds become gradually more responsive to influences of temperature.

If all the cultural practices are handled in such a manner that the trees cease growing and begin to ripen their wood early, the rest period begins earlier and is completed in early winter. If a period of warm weather occurs after the resting period is over, the trees are stimulated into growth activities and the buds are started. On the other hand, if the handling of the cultural practices has been such as to promote growth until rather late into the fall, the rest period does not come on so soon and is not completed until correspondingly late in the winter. The trees remain dormant during the warm periods in December and January, and the buds are not started enough to be injured by the lower temperatures that follow.

It seems, then, that the most advisable system of management for the peach orchard in the South consists in handling the different cultural practices, such as tillage, fertilization, pruning, thinning, disease and insect control so that the trees are maintained in a vigorous condition and kept growing until rather late in the fall.



New York Botanical Garden Library



3 5185 00259 6003

